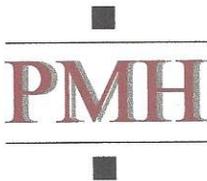


PROJECT MANUAL



A NEW HVAC SYSTEM FOR MYRTLE BEACH LAW ENFORCEMENT CENTER SPECIAL OPERATION BUILDING

MYRTLE BEACH, SOUTH CAROLINA
PMH NO. 17014
BID PROPOSAL NO. 17-B00081



PIKE ■ McFARLAND ■ HALL
ASSOCIATES, INC.
ARCHITECTS & PLANNERS
MYRTLE BEACH, SC



Myrtle Beach, SC

MAY 2017

SET # _____

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PROJECT MANUAL DATED MAY 2017

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PROJECT DIRECTORY

**A NEW HVAC SYSTEM FOR:
MYRTLE BEACH LAW ENFORCEMENT CENTER
SPECIAL OPERATION BUILDING
MYRTLE BEACH, SOUTH CAROLINA**

OWNER: The City of Myrtle Beach, Building Maintenance Department
921 North Oak Street
Myrtle Beach, SC 29577
(843) 918-1186
(843) 918-1158 FAX
Attention: Mr. Jay Hood, Facilities Services Manager

ARCHITECT: PIKE - MCFARLAND - HALL ASSOCIATES, INC.
1300 Professional Drive, Suite 201
Myrtle Beach, SC 29577
(843) 497-0272
(843) 497-0271 FAX
Attention: Mr. Joseph C. Pike, AIA
Mr. Bill Jacobson, AAIA, LEED AP BD+C

**PLUMBING
MECHANICAL
ELECTRICAL
ENGINEER:** RAST DALLERY ENGINEERS, PC
514 Alder Street, Suite 4
Myrtle Beach, SC 29577
(843) 232-0408
(843) 232-0508 FAX
Attention: Mr. Robert Dallery, P.E.

END OF PROJECT DIRECTORY

DOCUMENT 00020 – INVITATION FOR BIDS

Sealed bids from Mechanical Contractors properly licensed in South Carolina will be received by the City of Myrtle Beach on Thursday, July 13, 2017 until 10:00 AM local time, at the City of Myrtle Beach Purchasing Division located at 3231 Mr. Joe White Avenue, Myrtle Beach, South Carolina 29577, where they will be publicly opened and read aloud for:

**A NEW HVAC SYSTEM FOR:
MYRTLE BEACH LAW ENFORCEMENT CENTER
SPECIAL OPERATION BUILDING**

All work is within the existing Special Operation Building at the Myrtle Beach Law Enforcement Center located at 1101 North Oak Street in Myrtle Beach, South Carolina and consists of 1) replacing the existing Administration Area split-system heat pump in its entirety, 2) condition the Evidence Storage Area with a new split-system heat pump system, and 3) improve ventilation of the Warehouse Area with a new exhaust fan and louvers. The work also includes extend perimeter walls to seal the storage areas from the metal building exterior walls and from the open bay, provide insulation in all perimeter walls of the storage areas to prepare for conditioning and add roof insulation to the existing compressed insulation in the bay over the storage area.

Each bid must be accompanied by a bid guarantee of not less than FIVE PERCENT (5%) of the base bid, which may be a bid bond, issued by a bonding company that is on the approved list of the Treasurer of the United States, or a certified check made payable to the Owner. The successful bidder will be required to furnish Performance Bond and Labor & Material Payment Bond, each in the full amount of the contract sum, issued by a bonding company licensed to do business in South Carolina, and on the approved list of the Treasurer of the United States.

Bidding documents will be available on the City's website at www.cityofmyrtlebeach.com in the Vendor Registry / Current Bids section.

To be eligible for consideration, bids must comply with the laws of South Carolina, all conditions of the specifications, and must be made on the form provided, enclosed in an opaque sealed envelope bearing the name and license number of bidder and marked:

"A NEW HVAC SYSTEM FOR MYRTLE BEACH LAW ENFORCEMENT CENTER SPECIAL OPERATION BUILDING" and delivered not later than date and hour mentioned above.

A **MANDATORY PRE-BID** Conference for Mechanical Contractors and all other Major Sub-Contractors will be held Thursday, June 29, 2017 at 10:00 AM. The Pre-Bid Conference will be held at the existing job site located at 1101 North Oak Street, Myrtle Beach, SC 29577. **All other Sub-Contractors are strongly encouraged to attend.**

Owner reserves the right to reject any or all bids or certain portions of a bid as stipulated in the Form of Proposal, and to waive any minor informalities and technicalities in bidding, and to award the job in the best interest of the Owner. No bid shall be withdrawn for a period of sixty (60) days from the opening date.

END OF DOCUMENT 00020

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SECTION 00200 – INSTRUCTIONS TO BIDDERS

1. SUMMARY

1.1 DOCUMENT INCLUDES:

A. Invitation

1. Bid Submission
2. Work Identified in the Contract Documents
3. Contract Time and Liquidated Damages

B. Bid Documents and Contract Documents

1. Definitions
2. Availability
3. Examination
4. Queries/Addenda
5. Product/System Substitutions
6. Contract Documents

C. Site Assessment

1. Site Examination

D. Qualifications

1. Evidence of Qualifications
2. Subcontractors/Suppliers/Others

E. Bid Submission

1. Submission Procedure
2. Bid Ineligibility

F. Bid Enclosures/Requirements

1. Security Deposit
2. Performance Assurance
3. Bid Form Requirements
4. Bid Form Signature

G. Offer Acceptance/Rejection

1. Duration of Offer
2. Acceptance of Offer

1.02 RELATED DOCUMENTS

A. Document 00300 - Bid Forms

B. Document 00550 - General Provisions

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- C. Document 00650 - Architect's Supplementary Conditions
- D. Document 00700 - Contract Forms & Supplements

2. INVITATION

2.01 BID SUBMISSION

- A. Bids will be received by the City of Myrtle Beach (herein called the "Owner"), at the City of Myrtle Beach's Purchasing Division located at 3231 Mr. Joe White Avenue, Myrtle Beach, South Carolina 29577, Thursday, July 13, 2017 at 10:00 AM local time, at which time they will be publicly opened and read aloud.
- B. Bids submitted after the time and date set for the receipt will be returned to the Bidder unopened.
- C. Amendments to the submitted offer will be permitted if received in writing prior to Bid closing and if signed by the same party or parties who signed and sealed the original bid.

2.02 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

- A. The work includes all work described in the Contract Documents.
- B. Location: 1101 North Oak Street, Myrtle Beach, SC 29577
- C. The Owner reserves the right, to reject any and/or all Bids.

2.03 CONTRACT TIME AND LIQUIDATED DAMAGES

- A. Contractor shall complete all work within 120 calendar days. Liquidated damages of \$100.00 per day will be assessed for each day thereafter.

3. BID DOCUMENTS AND CONTRACT DOCUMENTS

3.01 DEFINITIONS

- A. Bid Documents: Contract Documents, Bid Forms, any Supplements to Bid Forms, and Bid Securities identified herein.
- B. Contract Documents: Defined in the Agreement Form.
- C. Bid: Act of submitting a sealed offer.
- D. Bid Price: Total cost to perform the work submitted by the Bidder in the Bid Form.

3.02 AVAILABILITY

- A. Documents will be available on the City's website at www.cityofmyrtlebeach.com in the Vendor Registry / Current Bids section.

3.03 EXAMINATION

- A. Each Bidder must satisfy themselves of the accuracy of the estimated quantities in the Bid

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Schedule by examination of the site, a review of the drawings, and by reading and being thoroughly familiar with the Contract Documents including Addenda. The failure or omission of any Bidder to do any of the foregoing shall in no way relieve any Bidder from any obligation in respect to its Bid.

- B. Bid Documents may be viewed by appointment at the office of the Architect.
- C. Upon receipt of Bid Documents, verify that documents are complete. Notify Architect should the documents be incomplete.
- D. Immediately notify the Architect upon finding discrepancies or omissions in the Bid documents.

3.04 QUERIES/ADDENDA

- A. Direct questions to the Architect's Project Manager, Bill Jacobson, Associate AIA, LEED AP BD+C, Pike – McFarland – Hall Associates, Inc., 1300 Professional Drive, Suite 201, Myrtle Beach, SC 29577; Phone: (843) 497-0272; Fax: (843) 497-0271; Email: bjacobson@pmharchitects.com
- B. Addenda may be issued during the Bidding period. All Addenda shall become part of the Contract Documents. Include any resultant cost adjustments in the Bid Price.
- C. Verbal instructions or comments are not binding on any party.
- D. Clarifications requested by Bidders must be in writing not less than seven (7) days before time set for receipt of Bids. The reply will be in the form of an Addenda, a copy of which will be forwarded to known recipients.
- E. Final Addenda will be issued five (5) business days before time of Bid.

3.05 PRODUCT/SYSTEM SUBSTITUTIONS

- A. Where the Bid Documents stipulates a particular product/system, substitutions will be considered unless otherwise stated in the Contract Documents.
- B. Bidders shall include in their Bid, any changes required in the Work to accommodate such substitutions. A later claim by the Bidder for an addition to the Contract Time or Contract Price because of changes in Work necessitated by use of substitutions shall not be approved.
- C. Substitutions shall be submitted to the Architect for approval, no later than ten (10) days before time set for receipt for bids.

3.06 CONTRACT DOCUMENTS

- A. The Contract Documents contain the provisions required for the completion of the work. Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Contractor or relieve him from fulfilling any of the conditions of the contract.

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4. SITE ASSESSMENT

4.01 SITE EXAMINATION

- A. The Bidder is responsible to inspect the project site before submitting a Bid in order to become familiar with site and soil conditions.
- B. The project site is open for examination by Bidders.

5. QUALIFICATIONS

5.01 EVIDENCE OF QUALIFICATIONS

- A. Bidders must be licensed to perform work in the State of South Carolina and shall include their license number on the Bid Documents.
- B. Evaluation of Bidders will concentrate on their experience with projects of comparable scope and complexity. Bidders shall indicate prior projects that exhibit these qualities in their statement of experience. Additional attachments exhibiting such experience must be included with the bid.

5.02 SUBCONTRACTORS/SUPPLIERS/OTHERS

- A. The Owner reserves the right to reject a proposed Subcontractor.
- B. Information on subcontractors shall be furnished by the Bidder to the Owner as required in the Contract Documents.
- C. All Subcontractor's must be approved in writing by the Owner prior to the performance of any work.
- D. All individuals that will be providing services on this project are subject to a criminal background check. This will be discussed further during the Mandatory Pre-Bid Conference.

6. BID SUBMISSION

6.01 SUBMISSION PROCEDURE

- A. Each Bid must be submitted in a sealed envelope, addressed to the City of Myrtle Beach, at P.O. Box 2468, Myrtle Beach, South Carolina 29578. If delivered by hand the Bid shall be delivered to the Office of Purchasing at 3231 Mr. Joe White Avenue, Myrtle Beach, South Carolina.
- B. Bids shall be enclosed in an opaque sealed envelope bearing the name and license number of the bidder and marked: **"A NEW HVAC SYSTEM FOR MYRTLE BEACH LAW ENFORCEMENT CENTER SPECIAL OPERATION BUILDING, Myrtle Beach, South Carolina"**.
- C. Bidders shall be solely responsible for the delivery of their Bids in the manner and time prescribed.
- D. Bids mailed shall be enclosed in another envelope. Insert the closed and sealed Bid Form in the envelope to be mailed.
- E. A summary of submitted Bids will be made available to all Bidders within five (5) working days following the Bid opening by the Architect.

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6.02 BID INELIGIBILITY

- A. Bids that are incomplete, unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, will at the discretion of the Owner, be declared non-responsive.

7. BID ENCLOSURES/REQUIREMENTS

7.01 SECURITY DEPOSIT

- A. Bids shall be accompanied by a security deposit as follows:
 - 1. Bid Bond of a sum no less than five (5%) percent of the Bid Price. (Include Power of Attorney).
 - 2. Certified check in the amount of five (5%) percent of the Bid Price.
 - 3. Other types of security may be allowed if pre-approved in writing by the Owner.
- B. Bids shall be submitted on the required form and shall include: Bid Proposal, Bid Bond, Non-collusion Affidavit, Bidder's Representation, Statement of License Certificate, Statement of Experience of the Bidder, Project Superintendent, List of Subcontractors, Execution of Contract and Local Vendor Preference.
- C. The Bid Bond shall name the Owner as Obligor, and be signed and sealed by the Contractor as principal as well as the Surety.
- D. Bid securities will be returned to all Bidders upon receipt by the Owner of the required Insurance, Performance, and Payment Bonds from the successful Bidder.
- E. Include the cost of Bid security in the Bid Price.
- F. All Bid securities will be returned to the respective Bidders.
- G. If no contract is awarded, all Bid securities will be returned.

7.02 PERFORMANCE ASSURANCE

- A. Successful Bidder: Shall provide the stipulated insurance, along with the Performance and Payment Bonds as described in the Contract Documents.
- B. Include the cost of bonding in the Bid Price.
- C. Attorneys-in-Fact who sign bid bonds or payment bonds and performance bonds must file with each bond a certified and effective dated copy of their power of attorney.

7.03 BID FORM REQUIREMENTS

- A. Complete all requested information in the Bid Form and Appendices.
- B. All Bids shall be submitted on the required Bid Form. All blank spaces for Bid prices must be filled in, in ink or typewritten, and the Bid Form must be fully completed and executed when submitted. Only one copy of the Bid Form is required.
- C. Bidders must satisfy themselves of the accuracy of the estimated quantities in the Bid Schedule

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by examination of the site and a review of the Contract Documents. After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities or nature of the Work.

7.04 BID FORM SIGNATURE

A. The Bid Form shall be signed by the Bidder, as follows:

1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.
2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature. Affix seal to each signature.
3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts under each signature. Affix the corporate seal. If the Bid is signed by officials other than the President and Secretary of the company, or the President/Secretary/Treasurer of the company, a copy of the by-law resolution of the Board of Directors authorizing them to do so must also be submitted with the Bid Form.
4. Joint Venture: Each party of the joint venture shall execute the Bid Form under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

8. OFFER ACCEPTANCE/REJECTION

8.01 DURATION OF OFFER

- A. Bids shall remain irrevocable for a period of thirty (30) days after the Bid closing date.
- B. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the owner and the successful Bidder.

8.02 ACCEPTANCE OF BID

- A. The Owner reserves the right to accept or reject any or all bids. Lowest bid may not prevail. Award of the bid will be based on the bid prices, references, past performance of bidder and any proposed subcontractor with projects of comparable scope, complexity, and time constraints.
- B. The Owner may make such investigations as he deems necessary to determine the ability of the Bidder to perform the Work, and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the Agreement and to complete the Work contemplated therein.
- C. The party to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond, Payment Bond, and Certificate of Insurance within ten (10) calendar days from the date when Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Agreement, Bond forms, and Certificate of Insurance. In case of failure of the Bidder to execute the Agreement, the Owner may at his option consider the Bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner.
- D. The Owner within ten (10) days of receipt of acceptable Performance Bond, Payment Bond,

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Certificate of Insurance and Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the Owner not execute the Agreement within such period, the Bidder may by written notice withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

END OF SECTION 00200

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for the
CITY OF MYRTLE BEACH

DOCUMENT 00300A - BIDDER'S REPRESENTATION

By the act of submitting a bid for the proposed contract, the Bidder represents that:

1. The Bidder and all subcontractors the Bidder intends to use have carefully and thoroughly reviewed the Contract Documents and have found them complete and free from ambiguities and sufficient for the purpose intended; and
2. The Bidder and all workmen, employees and subcontractors the Bidder intends to use are skilled and experienced in the type of work represented by the Contract Documents; and
3. Neither the Bidder nor any of the Bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, of the Owner, or the Owner's employees or agents including architects, engineers or consultants, in assembling the bid; and
4. The bid figure is based solely upon the Contract Documents and not upon any other oral or written representation.

By: _____

Title: _____

Subscribed and sworn to before me

this _____ day of _____, 20____.

My commission expires on: _____.

DOCUMENT 00300B

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of South Carolina)
County of Horry)

being first duly sworn, deposes and says that:

(1) He is _____ of _____,
the Bidder that has submitted the attached Bid:

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid:

(3) Such Bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Owners or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(Signed) _____

(Title)

Subscribed and sworn to before me this _____ day of _____, 20_____.

_____. My commission expires

_____ on: _____ (Title) _____

DOCUMENT 00300C

STATEMENT OF LICENSE CERTIFICATE

EACH CONTRACTOR BIDDING SHALL FILL IN AND SIGN THE FOLLOWING:

This is to certify that _____ have fully complied with all the requirements of the South Carolina Licensing Board for Contractors. The Contractor's license number and date of registration shall appear on the envelope containing the bid, otherwise the bid will not be considered.

_____ was issued Certificate No. _____
on _____, 20 ____ by the State Board for licensing General Contractors.

Signed: _____

Title: _____

DOCUMENT 00300D

STATEMENT OF EXPERIENCE OF THE BIDDER

The bidder is requested to state below what work of similar scope and complexity he has completed, and to give references that will enable the Owner to judge his experience, skill and business standing and his ability to conduct the work as completely and as rapidly as required under the terms of the contract.

<u>Project and Location</u>	<u>Reference</u>
1) _____ _____	_____ _____
2) _____ _____	_____ _____
3) _____ _____	_____ _____
4) _____ _____	_____ _____
5) _____ _____	_____ _____
6) _____ _____	_____ _____
7) _____ _____	_____ _____

Dated: _____ Bidder: _____

Signed: _____

Title: _____

DOCUMENT 00300E

PROJECT SUPERINTENDENCE

The Undersigned states that the following employee will assume the role of project superintendent representing the Contractor on this Project. The undersigned further states that this individual, whose qualifications are presented below (attach additional sheets, if necessary), will have authority to speak for the Contractor and will not be removed from this Project or temporarily substituted for on this Project without the written consent of the Owner and Project Engineer.

Project Superintendent's Name: _____

Years of Experience: _____

Brief but Complete Description of Experience Relevant to this Project: _____

References from Owners where work of similar scope, and complexity has been accomplished under Proposed Superintendent's direct supervision.

1. _____ 2. _____ 3. _____ 4. _____ 5. _____

(Phone) _____ (Phone) _____ (Phone) _____ (Phone) _____ (Phone) _____

"I consent to the disclosure of my qualifications and other applicable personal data for the purpose of evaluating proposals under this solicitation."

Employee's Signature

Date

"I certify to this employee's role in this Project and that the qualifications presented herein are accurate, complete and current."

Bidder: _____

Date: _____

Signed: _____

Title: _____

DOCUMENT 00300F

LIST OF SUBCONTRACTORS

The undersigned states that the following is a full and complete list of the proposed subcontractors on this Project and the class of work to be performed by each, and that such list will not be added to nor altered without written consent of the Owner.

	<u>Subcontractor Name, Address and SC License Number</u>	<u>Class of Work to be Performed</u>
1)	_____ _____ _____	ELECTRICAL
2)	_____ _____ _____	INSULATION INSTALLING CONTRACTOR
3)	_____ _____ _____	_____

Dated: _____

Bidder: _____

Signed: _____

Title: _____

DOCUMENT 00300G

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned,

_____ as PRINCIPAL, and

_____ as SURETY are hereby held and firmly bound

unto _____, as OWNER, in the penal sum of

_____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that Whereas the Principal has submitted to the City of Myrtle Beach a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the

NOW, THEREFORE,

- A. If said BID shall be rejected, or
- B. If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

THE SURETY, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)
Principal

Surety

By: _____

Date: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

DOCUMENT 00300H

BID PROPOSAL

Proposal of _____ (hereinafter called "BIDDER"),
organized and existing under the laws of the State of _____ doing business as
_____.*

*Insert "a corporation", "a partnership", or "an individual" as applicable.

To the City of Myrtle Beach, South Carolina, (hereinafter called "OWNER").
In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the
construction of the New HVAC System for Myrtle Beach Law Enforcement Center Special Operation
Building (hereinafter called "PROJECT") in strict accordance with the CONTRACT DOCUMENTS, within
the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto
certifies as to his own organization, that this BID has been arrived at independently, without consultation,
communication, or agreement as to any matter relating to this BID with any other BIDDER or with any
competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in
the NOTICE TO PROCEED and to fully complete the PROJECT within the time constraints as set forth in
Section 0200, Paragraph 2.03 - Contract Time and Liquidated Damages; Section 0650, Paragraph 1.12 -
Project Schedule, and; as further stated herein. BIDDER further agrees to pay as liquidated damages,
the sum of \$100.00 for each consecutive calendar day thereafter as provided in Section 0200, Paragraph
2.03 and Section 0650, Paragraph 1.12.

BIDDER acknowledges receipt of the following ADDENDUM:

Addendum No. _____,	Dated: _____
Addendum No. _____,	Dated: _____
Addendum No. _____,	Dated: _____

BID PRICE:

Having carefully examined the project manual with all corresponding specifications, drawings or other
such descriptions of the work to be performed as well as the worksite and conditions affecting the work,
the undersigned proposes to furnish all materials, labor, equipment and services necessary for the
execution of the entire work for the **BASE BID** listed below:

BASE BID:

_____ Dollars (\$) _____)

NOTE: Bids shall include sales tax and all other applicable taxes and fees.

ALTERNATES:

Description of Alternates herein are for identification purposes only; the Work to be performed under the particular Alternate(s) is described in Division 1 – General Requirements – Section 01100 of this Project Manual.

ALTERNATE NO. 1
(UV LIGHTS)

Add \$ _____

ALTERNATE NO. 2
(IONIZATION)

Add \$ _____

COMPLETION TIME:

If awarded the Contract, the undersigned agrees, (within ten (10) calendar days of the date of Notice to Proceed) to proceed and substantially complete the Base Bid of the project within 120 calendar days.

BID SECURITY:

The undersigned encloses Bid Security in the amount of not less than five percent (5%) of the Bidder's maximum Bid Price in the form of a Bid Bond, duly executed by the Bidder as Principal and issued by a Surety registered to conduct business in South Carolina. Complete requirements of Bid Bonds are given in section entitled, "Instructions to Bidders".

EXECUTION OF CONTRACT:

Bidder agrees that:

In case of failure on his part to execute the said Contract, Bonds, and any other required Contract Documents within 30 days after the date indicated in the "Notice of Award", the check or Bid Bond accompanying this Bid, and the money payable thereon, shall be paid to the OWNER as liquidated damages for such failure; otherwise the Bid Bond or check accompanying the Bid shall be returned to the undersigned.

Respectfully submitted:

Signature

Address

Title

Date

License Number (if applicable)

SEAL (if BID is by a corporation)

Attest: _____



CITY OF MYRTLE BEACH

LOCAL VENDOR PREFERENCE

TO QUALIFY FOR LOCAL PREFERENCE FORM MUST BE SUBMITTED WITH BID

APPLICATION OF ELIGIBILITY TO QUALIFY FOR LOCAL VENDOR PREFERENCE WITHIN THE DEFINED BOUNDARIES: MYRTLE BEACH CITY LIMITS, HORRY COUNTY, NESA AREA (NESA area is comprised of Horry, Georgetown, Williamsburg, Florence, Marion, Darlington, Dillon, Chesterfield, and Marlboro Counties).

City of Myrtle Beach Business License: (To qualify for Local Vendor Preference vendor must have had a City of Myrtle Beach Business License a minimum of ninety (90) days prior to the request for bid/ proposal being made public)

City of MB Business License Number: _____ Date issued: _____
***NOT Horry County License Number**

Complete all areas below. Incomplete forms may be rejected.

1. LEGAL NAME OF BUSINESS: _____

Mailing Address: _____

Physical Address: _____

(To qualify vendor must have maintained a physical address and office as a principal place of business within the defined boundaries of the category sought for at least one (1) year, and during that time have had a majority of full-time employees, chief officers and managers regularly conducting work and business from this office.)

2. Year business was established in the City of Myrtle Beach / Horry County / NESA area:

Year: _____ County: _____
(Name of County)

Under penalty of perjury, the undersigned states that the foregoing statements are true and correct. The undersigned also acknowledges that any person, firm, corporation or entity intentionally submitting false information to the City in an attempt to qualify for local preference shall be prohibited from bidding on City of Myrtle Beach products and services for a period of one (1) year.

Authorized Signature: _____ Date: _____

Printed Name & Title: _____ Phone: _____

LOCAL VENDOR PREFERENCE continued

<u>Bid Amount</u>	<u>Within City Limits</u>	<u>Within Horry County</u>	<u>Within NESAs Area</u>
Up to \$5000.00	5% of Bid	4% of Bid	3% of Bid
\$5001.00 to \$10,000.00	\$250.00 plus 4% of amount between \$5001.00 and \$10,000.00	\$200.00 plus 3% of amount between \$5001.00 and \$10,000.00	\$150.00 plus 2% of amount between \$5001.00 and \$10,000.00
\$10,001.00 and up	\$450.00 plus 3% of amount above \$10,000.00 with the maximum being \$2000.00, including the \$450.00	\$400.00 plus 2% of amount above \$10,000.00 with the maximum being \$1800.00, including the \$400.00	\$300.00 plus 1% of amount above \$10,000.00 with the maximum being \$1600.00, including the \$300.00

If company/individual performs services on City property a Certificate of Insurance **must be** provided prior to commencement of work meeting requirements of the City.

The vendor must submit a copy of their Local Vendor Preference Certificate with their bid.

An eligible business shall maintain such status throughout the term of any contract with the City. Failure to maintain such status or to keep current on all fees and taxes owed the City shall be grounds to terminate the contract.

SECTION 0550 – GENERAL PROVISIONS

I. REQUIREMENTS

A. Definitions

Whenever used in these General Provisions or in the other Contract Documents, the following terms shall have the meanings indicated which are applicable to both the singular and plural thereof:

1. "Directed", "permitted", "reviewed", "accepted", "approved", or words of similar import mean the direction, requirements, permission, approval, or acceptance of Architect, or Owner, unless stated otherwise.
2. "As shown", "as indicated", "as detailed", or words of similar import refer to the Drawings unless stated otherwise.
3. "Addenda", -- Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Contract Documents.
4. "Agreement", -- The written agreement between the Owner and Contractor outlining the work to be performed, the Contract Time, and the Contract Price.
5. "Application for Payment", -- The Periodical Estimate for Partial Payment Form which is to be used by Contractor in requesting progress or final payment and which is to include such supporting documentation as is required by the Contract Documents. A copy of the form is included with these Contract Documents.
6. "Bid", -- The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the work to be performed.
7. "Bonds", -- Bid, performances, and payment bonds and other acceptable instruments of security.
8. "Change Order", -- A written order to Contractor signed by Owner authorizing an addition, deletion, or revision in the work or an adjustment in the Contract Price or the Contract Time, issued on or after the effective date of the Agreement.
9. "Contract Price", -- The money payable by Owner to Contractor under the Contract Documents as stated in the Agreement (subject to the approximate quantities provisions in the Instructions to Bidders in the case of Unit Price Work).
10. "Contract Time", -- The number of days or the date stated in the Agreement for the completion of the Work.
11. "Contractor", -- The person, firm, or corporation with whom Owner has entered into the Agreement.
12. "Day", -- A calendar day of twenty-four hours measured from midnight to the next midnight.
13. "Defective", -- An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty, or deficient, or does not conform to the Contract Documents or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to Architect's recommendation of final payment.
14. "Drawings", -- The Drawings which show the character and scope of the work to be performed and which have been prepared or approved by Architect and are referred to in the Contract Documents.
15. "Effective Date of the Agreement", -- The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
16. "Engineer", -- The Professional Engineering Firm representing the Owner.
17. "Field Order", -- A written order issued by Architect which orders minor changes in the Work but which does not involve a change in the Contract Price or the Contract Time.

18. "Final Acceptance", -- The date when the construction of the project is complete in accordance with the Contract Documents so that the entire project can be utilized for the purposes for which it is intended and all monies due Contractor have been paid him in the final Application for Payment.
19. "General Requirements", -- Officially recognized materials and workmanship specifications of the Owner.
20. "Inspector", -- The Architecting or technical inspector duly authorized or appointed by Architect or by Owner, limited to the particular duties entrusted to him.
21. "Major Equipment", -- The major equipment items listed by name in the Contract Documents which are to be furnished and installed under the Contract.
22. "Modification", -- (a) A written amendment of the Contract Documents signed by both parties, (b) a Change Order, or (c) a Field Order. A modification may only be issued after the effective date of the Agreement.
23. "Notice of Award", -- The written notice by Owner to the successful Bidder stating that upon compliance with the conditions precedent enumerated therein, and within the time specified, Owner will sign and deliver the Agreement.
24. "Notice to Proceed", -- A written notice given by Owner to Contractor, (with a copy to Architect), fixing the date on which the Contract Time will commence to run and on which Contractor shall start to perform Contractor's obligation under the Contract Documents and the date on which all work scheduled under the Contract shall be completed.
25. "Owner", -- The City of Myrtle Beach, South Carolina.
26. "Project", -- The total construction of which the work to be provided under the Contract Documents may be the whole or a part, as indicated in the Contract Documents.
27. "Provide", -- As used in the Specifications means furnish and install.
28. "Shop Drawings", -- All drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other information prepared by a supplier and submitted by Contractor to illustrate material or equipment for some portion of the Work.
29. "Specifications", -- Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.
30. "Sub-Contractor", -- An individual, firm, or corporation having a direct contract with Contractor or with any other Sub-Contractor for the performance of a part of the work.
31. "Substantial Completion", -- The Work (or a specified part thereof) which has progressed to the point where, in the written opinion of Architect, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purpose for which it was intended. The terms "substantially complete" and "substantially completed", as applied to any Work, refer to Substantial Completion thereof.
32. "Supplier", -- A manufacturer, fabricator, supplier, distributor, materialman, or vendor.
33. "Work", -- The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work is the result of performing services, furnishing labor, and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

B. ABBREVIATIONS

Wherever abbreviations are used in this Contract Document, each such abbreviation shall have the following listed meaning:

UNIT OF MEASURE

CY	Cubic Yard
Ft.	Feet

Lbs.	Pounds
M	One Thousand
MFBM	One Thousand Feet Board Measure
C	Centigrade
F	Fahrenheit
HP	Horsepower
KVA	Kilovolt Ampere
BTU	British Thermal Unit
LF	Linear Feet

TYPES AND UNITS

DI	Ductile Iron
PVC	Polyvinyl Chloride
HDPE	High Density Polyethylene
MJ	Mechanical Joint
B & S	Beel and Spigot
T & G	Tongue and Groove
SS	Single Strength
DS	Double Strength
VC	Vitrified Clay
RC	Reinforced Concrete
MH	Manhole
CB	Catchbasin
ES	Extra Strength

ORGANIZATIONS AND PUBLICATIONS

AASHO	American Association of State Highway Officials
ACI	American Concrete Institute
AIEE	American Institute of Electrical Architects
AISC	American Institute of Steel Construction
ASA	American Standards Association, Inc.
ASME	American Society of Mechanical Architects
ASTM	American Society for Testing and Materials
AWWA	American Waterworks Association
AWS	American Welding Society
MISS	Manufacturers Standardization Society of the Valve and Fitting Industry
NBFU	National Board of Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
PCA	Portland Cement Association
UL	Underwriters Laboratory
UBC	Uniform Building Code

C. CONTRACTOR'S BONDS

1. Faithful Performance Bond: As a part of the execution of this Contract, the Contractor shall furnish to the Owner, a bond payable to the City of Myrtle Beach in the form of Faithful Performance Bond set forth herein, secured by a surety company acceptable to the Owner, conditioned upon the faithful performance of all covenants and stipulations under this contract. Attorney in fact of Power of Attorney signature on bonds is permissible. The

amount of the bond shall be not less than one hundred percent (100%) of the total contract amount as set forth in the Agreement.

2. Labor and Material Bond: As a part of the execution of this Contract, the Contractor shall furnish to the Owner, a bond of surety company acceptable to the Owner in a sum of one hundred percent (100%) of the total contract amount, as set forth in the Agreement for the payment in full of all persons, companies or corporations who perform labor upon or furnish material to be used in the work under this Contract.
3. Bid Bond: 5% of total Contract.
4. Notification of Surety Companies: The Contractor shall advise the surety companies and other signers of the bonds listed above to familiarize themselves with all of the conditions and provisions of this Contract, and they shall waive the right of special notification of any change or modification to this Contract or of extension of time, or of decreased or increased work, or of the cancellation of the Contract or of any other act or acts by the Owner or its authorized employees and agents, under the terms of this Contract and failure to so notify the aforesaid surety companies of changes shall in no way relieve the surety companies of their obligations under this Contract.

D. CONTRACTOR'S INSURANCE

1. Public Liability and Property Damage.

The Contractor shall purchase and thereafter maintain for the term of this Agreement and any subsequent extensions hereto, public liability insurance to protect Contractor from claims for bodily injury and/or property damage which may result from Contractor's performance of this Agreement. The policy shall provide a combined single limit of liability of \$1,000,000 per occurrence for bodily injury and property damage with an aggregate limit of not less than \$1,000,000.

2. Automobile Liability.

The Contractor shall purchase and thereafter maintain for the term of this Agreement and any subsequent extensions hereto, comprehensive automobile liability insurance to protect the Contractor from claims for bodily injury and property damage which may arise from Contractor's use of motor vehicles in the performance of this Agreement. The policy must provide coverage for "ANY AUTO (CODE 1)" and Contractual Liability (endorsement CA 0025). The policy shall provide for a combined single limit of \$1,000,000 per occurrence for bodily injury and property damage.

3. Workers' Compensation Insurance.

Prior to beginning the work, the Contractor shall take out full compensation insurance for all persons which may be employed directly or indirectly in the performance of this Agreement. The policy must provide Employers Liability coverage in the amount of \$500,000 each accident; \$500,000 bodily injury by disease each employee and \$500,000 bodily injury by disease policy limit and shall be maintained in full force and effect during the term of this Agreement and any subsequent extensions hereto.

4. Excess Liability Policy.

At the option of the Contractor, the limits of the primary general liability, automobile liability and employer's liability policies may be less than stipulated herein, with an excess policy providing the additional limits required. This form of coverage must be approved by the Owner and will only be acceptable when both the primary and excess policies include the coverages and endorsements required herein.

5. Builders Risk Insurance.

If applicable, the Owner shall provide and maintain Builders Risk coverage in an amount equal to 100% of the Project's completed value. Coverage shall include but not be limited to, fire, lightning, windstorms, hail, smoke, explosion, riot, riot attending a strike, civil commotion, aircraft, vehicles, vandalism, malicious mischief, glass breakage, falling objects, water damage, collapse, flood and earthquake. The policy shall include coverage, but not be way of limitation, for all damage or loss to the work and to appurtenances, materials and equipment to be used on the Project while same are stored on the work site or approved storage area. Coverage does not extend to any tools, equipment or materials which are not intended to become part of the Project. All losses will be adjusted with and be made payable to the Owner. The Owner shall provide the Contractor with a Certificate of Insurance reflecting the foregoing, and that coverage will remain in effect until the Project has been accepted by the Owner. The policy shall be endorsed with a "Waiver of Occupancy" to allow the Owner to use the property during the Project.

6. Policy Endorsements.

The following clauses shall be endorsed to the policy(s) indicated below:

a. General Liability and Automobile Liability

1. "It is understood and agreed that in consideration of the terms and conditions of this policy to which this endorsement is attached, the City of Myrtle Beach, its officials, agents and employees are recognized as additional named insureds under the policy and as such will be provided thirty (30) days written notice of non-renewal, exhaustion of aggregate limit, modifications of coverage or cancellation for any reasons and the company hereby agrees to provide such notice. Failure of the company to provide the required notice shall cause the coverage to continue in force for the benefit of the Owner, its officials, agents, and employees until proper notification as required herein is provided, the provisions of the policy or any certificate of insurance to the contrary notwithstanding."

Contractor's insurance shall be primary to any insurance or self-insurance maintained by the Owner, its officials, agents or employees, which is considered excess and non-contributing for the purpose of this Agreement".

2. "The company shall not have recourse against the Owner for payment of any premiums, deductibles or for payment of any premiums, deductibles or for assessments under this policy."
3. "Failure of any named insured to comply with the reporting requirements of the policy shall not affect the coverage provided to the Owner as an additional insured."

b. Workers' Compensation

1. "Underwriters have no right of recovery of subrogation against the Owner for losses which result from work performed under this Agreement."
2. The cancellation provision is hereby amended to provide that the Owner will be provided thirty (30) days written notice in the event of coverage cancellation.

7. Subcontractors.

Contractor shall not be required to name Subcontractors as additional insureds in any

insurance policy required herein. Contractor will, however, secure certificates of insurance as evidence that each Subcontractor carries insurance to provide coverage under this Agreement in the same form as is required of the Contractor.

8. Notifications of Insurance Companies.

It is the responsibility of the Contractor to notify all insurance companies to familiarize themselves with all terms and conditions of this Agreement. The insurance companies shall waive their right of notification by the Owner of any change or modification of this contract, or of decreased work or increased work, or of the cancellation of this Agreement or of any other acts by the Owner or its authorized employees or agents under the terms of this Agreement. The waiver by the insurance companies shall in no way relieve them of their obligations under this Agreement.

9. Certificates of Insurance.

Contractor shall file with the Owner a certificate of insurance for approval by the Owner prior to the inception of any work. Renewal certificates shall be sent to the Owner 30 days prior to the expiration date of any policy required herein. The Owner reserves the right to require submission of certified copies of all insurance policies at its sole discretion.

10. Coverage Cancellation or Unsatisfactory Coverage.

If at any time any of the foregoing policies shall be or become unsatisfactory to the Owner, as to form or coverage, or if a company issuing any such policy shall be or become unsatisfactory to the Owner, the Contractor shall, upon notice to that effect from the Owner, promptly obtain a new policy and submit the same for approval to the Owner. Upon failure of the Contractor to furnish, deliver and maintain the insurance coverages required herein, this Agreement, at the sole discretion of the Owner, may be forthwith declared suspended, discontinued or terminated. Failure of the Contractor to take out and/or maintain any required insurance shall not relieve the Contractor from any liability under this Agreement, nor shall the insurance requirements be construed to conflict with or otherwise limit the obligations of the Contractor concerning indemnification.

11. Hold Harmless.

Contractor agrees to protect, defend, indemnify and hold the Owner, its officers, employees and agents free and harmless from and against any and all losses, fines, penalties, damages, settlements, costs, changes, professional fees or other expenses and liabilities of every kind and character arising out of or relating to any and all claims, liens, demands, obligations, actions, proceedings, or causes of action of every kind in connection with or arising out of this Agreement and/or the performance hereof, that are due to the actions of, or failure to act by the Contractor, its officers, employees, subcontractors or agents. The Contractor further agrees to investigate, handle, respond to, provide defense for and defend the same at its sole expense and agrees to bear all other cost and expenses related thereto.

E. LOCATION OF EXISTING UTILITIES AND PIPING

The location of existing piping and underground utilities, as shown on the Drawings have been taken from existing record drawings, and information provided by other utilities. However, the Owner does not assume responsibility for the possibility that during construction utilities other than those shown may be different from the locations designated on the Drawings.

The Contractor shall proceed with caution in any excavation so that the exact location of underground utilities may be determined. Before excavation or boring is commenced, it shall be the duty of the Contractor to contact all utility companies to aid in locating their underground installations. The Contractor shall, at his own expense, furnish all labor and tools to verify and substantiate the indicated locations.

Any utility lines, services, poles or other structures which are damaged shall be repaired or replaced by the Contractor at his expense and the Contractor shall indemnify the Owner from any claims resulting from such damage.

Due to the nature of the work, adjustments may be required in new construction to meet existing conditions. Such adjustments shall be made by the Contractor without additional cost to the Owner unless the scope of such adjustment(s) is approved by the Owner in the form of a Change Order.

F. LABOR PROVISIONS

The Contractor shall employ only competent and skilled workers and forepersons in the conduct of the Project. The Owner shall have the authority to order the Contractor to remove from the Project any of Contractor's employees who refuse to obey instructions relating to the carrying out of the provisions and intent of the provisions of the Contract, or who are incompetent, unfaithful, abusive, threatening or disorderly in their conduct, and any such person shall not again be employed on the Project.

G. NOTICE OF STARTING WORK

The Contractor shall notify the Architect and Owner in writing forty-eight (48) hours before starting work at the Project Site. In case of a temporary suspension of work, he shall give reasonable notice before resuming work.

H. EFFECT OF EXTENSION OF TIME

The granting of any extension of time on account of delays which in the judgment of the Owner are avoidable delays shall in no way operate as a waiver on the part of the Owner of its rights under this Contract.

I. EXTRA WORK

If extra work is assigned in accordance with the provisions of this contract, such work shall be considered a part hereof and subject to all its terms and requirements. Any such extra work shall be in the form of a Change Order to the Contract.

J. ASSIGNMENT OF CONTRACT

The Contract may not be assigned in whole or in part except upon the written consent of the Owner.

K. DISCREPANCIES

Anything called for by one of the Contract Documents and not called for by others shall be of like effect as if required or called for by all. Any discrepancies between any parts of the Contract Documents shall be called to the attention of the Architect by the Contractor, in writing, for a decision before proceeding with the work affected thereby.

L. LIABILITY OF OWNER'S REPRESENTATIVES AND OFFICIALS

No official or employee of the Owner, nor the Architect, nor any authorized assistant or agent of either, shall be responsible for construction means, methods, techniques, sequences or procedures, time of performance or for safety precautions and programs in connection with the work. The Architect shall not be responsible for the failure of the Contractor to carry out the work in accordance with the Contract Documents. The Architect shall not be responsible for acts or omissions of the Contractor, any Subcontractor(s), or any of their agents or employees, or any other persons performing the work.

M. EFFECT OF INSPECTION AND PAYMENT

Neither the inspection by the Architect nor by any of his agents, nor by an inspector, nor any order, measurements, approved modification, certificate or payment of money, nor acceptance of any part or whole of work, nor any extension of time, nor any possession by the Owner or its agents, shall operate as a waiver of any provision of this Contract or of any power reserved therein to the Owner or any right to damages thereunder; nor shall the waiver of any breach of this Contract be held to be a waiver of any other or subsequent breach. All remedies shall be construed as cumulative.

II. LEGAL RELATIONS AND RESPONSIBILITY

A. LAWS TO BE OBSERVED

The Contractor shall keep himself fully informed of all applicable Federal, State, County, and City laws, ordinances and regulations which in any manner affect those engaged or employed in the work or the materials used in the work or the conduct of the work or the rights, duties, powers, or obligations of the Owner or of the Contractor or which otherwise affect the Contract, and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. He shall at all times observe and comply with, and shall cause all his agents, subcontractors and employees to observe and comply with, all such laws, ordinances, regulations, orders and decrees; and shall protect and indemnify the Owner, the Architect and all of their officers, agents and employees, against any claim, loss or liability arising or resulting from or based upon the violation of any such laws, ordinance, regulation, order or decree, whether by himself or by his agents, subcontractor or employees. If any discrepancy or inconsistency is discovered in the Contract Documents for the work in relation to such laws, ordinance, regulation, orders or decree, the Contractor shall forthwith report the same to the Architect and the Owner.

B. PROVISIONS OF LAW

It is specifically provided that this Contract is subject to all applicable laws and that the rules of law shall prevail over any provision contained in any of the Contract Documents which may be in conflict thereto or inconsistent therewith.

III. RESPONSIBILITIES AND RIGHTS OF CONTRACTORS

A. ATTENTION TO WORK

The Contractor shall direct the work using his best skill and judgment and shall give his personal attention to and shall supervise the work to the end that it shall be performed faithfully, and when he is not personally present on the work, he shall at all times be represented by a competent superintendent or foreman who shall be present at the work and who shall receive and obey all instructions or orders given under this Contract, and who shall have full authority to execute the same, and to supply materials, tools and labor without delay and who shall be the legal representative of the Contractor. The Contractor shall be solely responsible for all construction

means, methods, techniques, sequences and procedures, time of performance and for safety precautions and programs and for coordinating all portions of the construction. The Contractor shall be liable for the faithful observance of any instructions delivered to him or to his authorized representative.

B. ACCESS TO WORK

The Contractor shall at all times provide facilities for access and inspection of the work by representatives of the Owner and of such official governmental agencies having jurisdictional rights to inspect the work.

C. WORK SITE

1. Use of Work Site. The Contractor shall confine his equipment, apparatus, the storage of materials, and operations of his workers to limits indicated by the law, ordinance, permit, Contract Documents or directions of the Owner.

The Contractors shall not load or permit any part of a structure to be loaded with weight that will endanger its safety. The Contractor shall observe and enforce the Owner's instructions regarding signs, advertisements, fires and smoke, unless such instructions are non-permissible in accordance within the jurisdiction of another authority.

2. Use of Private Land. The Contractor shall not use any vacant lot or private land as a plant site, depository for materials, or as a spill site, or for any other purpose without the written authorization of the person(s) owning the property and the written approval of the Owner for the use of such property. A copy of the written Agreement between the property owner and the Contractor shall be provided to the Owner.

D. SIGNS

The Contractor may place and maintain one sign board on the Project site. No other commercial or advertising signs will be allowed on the work site or on public property in the vicinity of the work. The layout and content of the sign shall be approved by the Owner.

E. LIABILITY OF CONTRACTOR

The Contractor shall do all of the work and furnish all labor, materials, tools and appliances, except as otherwise herein expressly stipulated, necessary or proper for performing and completing the work herein required in the manner and within the time specified in the Contract Documents. The mention of any duty or liability imposed upon the Contractor shall not be construed as a limitation or restriction or any general duty or other liability imposed upon the Contractor by this Contract, said reference to any specific duty or liability being made merely for the purpose of explanation. The Contractor shall provide all items, materials, articles, operations or methods listed, noted, mentioned or scheduled on the drawings or in any of the Contract Documents, including all labor, materials, plant, equipment, transportation and incidentals required and necessary for the completion of the work, and unless specifically shown otherwise herein, all plant, equipment and other works shall be completed in place and approved for operation. The Contractor shall be responsible to the Owner for the acts and omissions of all his employees, and all other persons performing any of the work under a contract with the Contractor.

F. ASSUMPTION OF RISKS

The Contractor shall rebuild, replace, repair, restore, and make good all injuries, damages, re-erection, and repairs occasioned or rendered necessary by causes of any nature whatsoever, to

all or any portions of the work, except as otherwise stipulated, until completion and acceptance by the Owner.

G. RESPONSIBILITY FOR DAMAGE

The Contractor shall indemnify and save harmless the Owner, its officers, employees, and agents and the Architect from any and all loss, liability or damage and from all suits, actions, damages, or claims, of every name and description arising from the acts and omission of the Contractor, its employees, agents, representatives, or subcontractors.

H. PROTECTION OF PERSONS AND PROPERTY

The Contractor will be solely and completely responsible for conditions of the work site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.

The Contractor shall furnish such watchmen, guards, fences, warning signs, lights and walkways, and shall take all other precautions as shall be necessary to prevent damage to persons or property. All structures and improvements in the vicinity of the work shall be protected by the Contractor, and if such property is damaged, injured or destroyed by the Contractor, his employees, Subcontractors, or agents, it shall be restored to a condition as good as when he entered upon the work.

The safety provisions of applicable laws, including but not limited to building and construction codes, shall be observed. Machinery, equipment, and all hazards shall be eliminated or guarded in accordance with OSHA standards.

Any construction inspection conducted by the Owner and/or Architect of the contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures.

I. PROTECTION OF CONTRACTOR'S WORK AND PROPERTY

The Contractor shall protect his work, supplies, and materials from damage due to the nature of the work, the action of the elements, trespassers or any cause whatsoever, until the completion and acceptance of the work.

Neither the Owner nor any of its officers, employees or agents nor the Architect assumes any responsibility for collecting indemnity from any person or persons causing damage to the work of the Contractor.

J. PROTECTION OF EXISTING STRUCTURES

Unless otherwise indicated in the Contract Documents or unless otherwise taken care of by the Owner thereof, all utilities and all structures of any nature, whether below or above ground, that may be affected by the work shall be protected and maintained by the Contractor and shall not be disturbed or damaged by him during the progress of the work; provided that should the Contractor disturb, disconnect, or damage any utility or any structure, all expenses of whatever nature arising from such disturbance or the replacement or repair thereof shall be borne by the Contractor.

K. MAINTENANCE OF TRAFFIC

Throughout the performance of the work or in connection with this Contract, the Contractor shall

construct and adequately maintain suitable and safe crossing over the trenches and such detours as are necessary to care for public and private traffic. The material excavated from trenches shall be compactly deposited along the side of the trench or elsewhere in such manner as shall give as little inconvenience as possible to the traveling public, to adjoining property owners, to other contractors or to the Owner. Where necessary or required, road detours must be approved by the Owner or other appropriate authorities at least 24 hours in advance of the proposed rerouting. MUTCD standards must be adhered to at all times.

L. PRESERVATION OF STAKES AND MARKS

The Contractor shall carefully preserve all bench marks, reference points, stakes, property pins, survey monuments and like items. In case he causes damage or disturbance, he will be charged with the resulting expense of replacement and shall be responsible for any mistakes that may be caused by their loss or disturbance.

M. APPROVAL OF CONTRACTOR'S PLAN

The approval by the Architect or the Owner of any drawing or any method of work proposed by the Contractor shall not relieve the Contractor of any of his responsibility for any errors therein and shall not be regarded as any assumption of risk of liability by the Owner or any officer or employee thereof, and the Contractor shall have no claim under the Contract due to the failure or inefficiency of any plan or method approved. Such approval shall be considered to mean merely that the Architect or Owner has no objection to the Contractor's using, upon his own full responsibility, the plans or methods proposed.

N. SUGGESTIONS TO CONTRACTOR

Any plan or method of work suggested by the Architect or Owner to the Contractor, but not specified or required, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor. The Architect and the Owner shall assume no responsibility therefore.

O. LICENSES, PERMITS AND REGULATIONS

The Contractor shall secure all Federal, State, County and City licenses required by law. He shall obtain and pay for all necessary permits. He shall give all notices and comply with all laws, ordinances and regulations bearing on the conduct of the work as drawn and specified.

P. TAXES

Contractor shall, without additional expenses to the Owner, pay all applicable Federal, State and Local sales and other taxes, except taxes and assessments on the real property comprising the site of the Project.

Q. CONSTRUCTION UTILITIES

The Contractor shall provide and maintain all necessary utilities, including but not limited to water, electricity, telephones, roads, fences, sanitary facilities, suitable storage places, except as may be otherwise specifically stipulated in the Contract Documents. Sanitary facilities shall be suitable for those employed on this Contract and of a type that will not create a public nuisance. He shall provide and maintain an adequate potable water supply for use of employees at the site of the work. Sanitary facilities and potable water supply shall be subject to approval of Local and State regulatory agencies.

R. COORDINATION

The Contractor shall coordinate his schedule with all other contractors or employees of the Owner who may be working in the vicinity of the work site. He shall conduct his operation as to interfere to the least possible extent with the work of such contractors or employees.

S. SUBCONTRACTORS

The Contractor shall notify the Owner in writing of the names of all Subcontractors he proposed to employ on the Contract and shall not employ any Subcontractors until the Owner's approval in writing covering such Subcontractors has been obtained. Such approval shall not be unreasonably withheld.

The Contractor agrees to be fully and directly responsible to the Owner for all acts and omissions of his Subcontractors and of any other person employed directly or indirectly by the Contractor or Subcontractors, and this Contract obligation shall be in addition to the liability imposed by law upon the Contractor.

Nothing contained in the Contract Documents shall create any contractual relationship between Subcontractor and the Owner. It shall be further understood that the Owner will have no direct relations with any Subcontractor. Any such necessary relations between the Owner and the Subcontractor shall be handled through the Contractor.

The Contractor agrees to bind every Subcontractor by all terms of the Contract Documents as far as applicable to the Subcontractor's work.

T. UNSATISFACTORY SUBCONTRACTORS

Should any Subcontractor fail to perform in accordance with the provisions of this Contract, the Contractor shall be notified in writing to take proper corrective action, or the Owner may require that the Contractor terminate the Subcontractor.

U. REMOVAL OF CONDEMNED MATERIALS AND STRUCTURES

The Contractor shall remove from the work site all rejected or condemned materials or structures of any kind brought to the work site or incorporated in the work. Upon his failure to do so, or to make satisfactory progress in so doing within forty-eight (48) hours after the service of a written notice from the Architect or Owner, the rejected or condemned material or work may be removed by the Owner and the cost of such removal shall be subtracted from monies that may be due or may become due to the Contractor on account of or by virtue of this Contract. No such rejected or condemned material shall again be offered for use by the Contractor under this Contract.

V. ERRORS AND OMISSIONS

If the Contractor, in the course of the work, finds any errors or omissions in the Contract Documents or in the layout as given by survey points and instructions, or if he finds any discrepancy between the Contract Documents and physical conditions of the work site he shall immediately notify the Architect, in writing for correction. Any work done after such discovery, until authorized, will be done at the Contractor's risk.

W. PROOF OF COMPLIANCE WITH CONTRACT

In order that the Architect and the Owner may determine whether the Contractor has complied with the requirements of the Contract Documents, compliance with which is not readily

ascertainable through inspection and tests of the work and materials, the Contractor shall, at any time requested, submit to the Architect and the Owner properly authenticated documents or other satisfactory proof as to his compliance with such requirements.

X. CLEANING UP

The Contractor shall not allow the work site to become littered with trash and waste materials, but shall maintain the same in a neat and orderly condition throughout the term of the Contract. The Contractor shall dispose of any such materials in accordance with all applicable laws. On or before completion of the work, the Contractor shall thoroughly clean all pits, pipes, chambers, or conduits which are a part of the work or premises which he has entered upon, shall bear down and remove all temporary structures built by him and shall remove rubbish of all kinds from any of the grounds he has occupied and leave them in a neat and clean condition.

Y. FINAL GUARANTY

All workmanship and materials shall be guaranteed by the Contractor for a period of one year from the date of final acceptance by the Owner, unless otherwise stipulated in the Contract Documents.

If, within said guaranty period, repair or changes are required in connection with the work, which, in the opinion of the owner, is rendered necessary as the result of use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the Contract, the Contractor shall promptly upon receipt of written notice from the Owner, and without expense to the Owner: (a) place in satisfactory condition all of such work, correct all defects therein; and (b) make good all damage to the building, site, equipment or contents thereof, which in the opinion of the Owner, is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract; and (c) make good any work or material, or the equipment and contents of building structure or site disturbed in fulfilling any such guarantee.

If the Contractor fails to comply within ten (10) days after receipt of written notice with the terms of this guaranty, the Owner may have the defects corrected, and the Contractor shall be liable for all expenses incurred; provided, however, that in case of an emergency where in the opinion of the Owner, delay would cause serious loss or damage, repairs may be made without notice being given to the Contractor and the Contractor shall pay the cost thereof.

Z. PATENTS

1. Except as otherwise provided in these Contract Documents, Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and agrees to indemnify and save harmless Owner, Architect, and their duly authorized representatives or employees, from all suits at law, or actions of every nature for, or on account of the use of, any patented materials, equipment, devices, or processes.
2. Should Contractor, his agents, servants, or employees, be enjoined from furnishing or using any invention, article, material, or appliance supplied or required to be supplied or used under this Contract, Contractor shall promptly offer other articles, materials, or appliances in lieu thereof, of equal efficiency, quality, finish, suitability, and market value, for review by Architect. If Architect should disapprove the offered substitutes and should elect, in lieu of a substitution, to have supplied, and to retain and use, any such invention, article, material, or appliance as may by this Contract be required to be supplied, Contractor shall pay such royalties and secure such valid licenses as may be requisite and necessary for Owner and officers, agents, and employees, or any of them, to use

such invention, article, material, or appliance without being disturbed or in any way interfered with by any proceeding in law or equity on account thereof. Should Contractor neglect or refuse to make any approved substitution promptly, or to pay such royalties and secure such licenses as may be necessary, then in that event Architect shall have the right to make such substitution, or Owner may pay such royalties and secure such licenses and charge the cost thereof against any money due Contractor from Owner, or recover the amount thereof from him and his sureties notwithstanding that final payment under this Contract may have been made.

AA. LEGAL RESPONSIBILITY OF CONTRACTOR IN PERFORMING WORK

The Contractor shall be required to comply with all Local, State, and Federal laws or regulatory requirements applicable to the performance of this Contract, to include any laws promulgated or enacted during the Contract Time. Lack of knowledge of such laws or regulations shall not relieve the Contractor of this duty. Any losses resulting to the Owner because of the failure of the Contractor to comply with this duty shall be borne by the Contractor.

BB. WARRANTY OF TITLE

No material, supplies, or equipment to be installed or furnished under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease-purchase or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor shall warrant good title to all materials supplied and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the Owner free from any claims, liens or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the Owner. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

IV. RESPONSIBILITIES AND RIGHTS OF OWNER

A. SURVEYS AND STAKING

The Owner, through the Architect, will survey and place control stakes for general layout and control grades for the construction work. The protection and care of such stakes shall thereafter be the responsibility of the Contractor, and any stakes lost or destroyed will be replaced at the Contractor's expense.

B. RIGHTS-OF-WAY

The Owner will provide all necessary rights-of-way and easements.

C. AUTHORITY OF THE ARCHITECT

All work performed under this Contract shall be in accordance with the Contract Documents and in a good workmanlike manner. To prevent disputes and determine acceptability and fitness of the several kinds of work and materials which are to be paid for under this Contract the Architect shall: (a) decide all questions relative to the true construction meaning, and intent of the Contract

Documents; (b) decide all questions which may arise relative to the classifications and measurements of quantities and materials and the fulfillment of this Contract; (c) and have the authority to reject or condemn all work or material which does not conform to the terms of this Contract. The Architect's estimate and decision in all matters shall be a condition precedent to an appeal to the Owner for other compensation under this Contract, and a condition precedent to any liability on the part of the Owner to the Contractor on account of this Contract.

D. INSPECTION

The Architect, Owner, and their representatives shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and for inspection.

If the Contract Documents, the Architect's instructions, laws, or ordinances require any work to be specifically tested or approved, the Contractor shall give the Architect and the Owner timely notice of the date and time fixed for the inspection or test.

If any work for which inspection is required in accordance with the Contract is covered without the approval and consent of the Architect, the work shall be uncovered for inspection and restored at the Contractor's expense. Any work for which inspection is not specifically required by the Contract may be uncovered for inspection by the Architect. If such work is found to be in accordance with the Contract Documents, the Owner will pay the cost of re-examination and replacement. If such work is not in accordance with the Contract Documents, the Contractor shall pay such cost.

Properly authorized inspectors shall be considered to be the representatives of the Owner, limited to the duties and power entrusted to them. Inspectors shall be authorized to inspect materials and workmanship of those portions of the work to which they are assigned, either individually or collectively, and under instructions of the Architect and Owner are to report any and all deviations from the Contract Documents which may come to their notice. Any inspector shall have the right to order the work stopped if, in his judgment, such action is necessary to (a) allow proper inspection, (b) avoid irreparable damage to the work, or (c) avoid subsequent condemnation of work which could not be readily replaced or restored to an acceptable condition. Such stoppage shall be for a period reasonably necessary for a determination by the Architect that the work will in fact proceed in due fulfillment of all Contract requirements.

E. RETENTION OF DEFECTIVE WORK

If any portion of the work performed or material furnished under this Contract shall prove defective, and if the imperfection in the same shall not be of sufficient magnitude or importance to make the work dangerous or wholly undesirable, or if the removal of such work is impracticable or will create conditions which are dangerous or undesirable, the Architect, with the approval of the Owner, shall have the right and authority to retain such work instead of requiring the defective work to be removed and reconstructed. The Architect shall recommend to the Owner such deductions therefore in the payments due or to become due the Contractor as may be just and reasonable, and the Owner may make such deductions as are reasonable.

F. CHANGES IN WORK

The Owner shall have the right to order additions to, omissions from, or corrections, alterations and modifications in the line, grade, form dimensions, plan or kind or amount of work or materials herein contemplated, or any part thereof, either before or after the beginning of construction. Changes involving an increase or decrease in the cost of the work, the time permitted for the work, or inconsistencies within the Contract Documents, shall be approved in accordance with

terms set forth in "Alterations, Omissions and Extra Work" of these General Provisions, and such order will be binding upon the Contractor. Such alterations shall in no way affect, vitiate, or make void this Contract or any part thereof, except that which is necessarily affected by such alterations.

In any case of neglect or refusal by the Contractor to perform any extra work which may be authorized by the Owner or to make satisfactory progress in the execution of the same, the Owner may employ any person or persons to perform such work and the Contractor shall not in any way interfere with the person or persons so employed.

G. ADDITIONAL DRAWINGS

The Owner may furnish, through the Architect, additional drawings during the progress of the work as are necessary to make clear or to define in greater detail the intent of the Contract Documents. The Contractor shall make his work conform to all such drawings.

H. EMERGENCY PROTECTION

In the event of any emergency which threatens loss, damage or injury to persons or property, and which requires immediate action to remedy, the Owner, with or without notice to the Contractor, may provide suitable protection to the said property and persons by causing such work to be performed and such material to be furnished as shall provide such protection as the Owner may consider necessary and adequate. The cost and expense of such work and material so furnished shall be borne by the Contractor, and if the same shall not be paid on presentation of the bills therefore, such costs shall be deducted from any amounts due or to become due the Contractor.

The performance of such emergency work under the direction of the Owner shall in no way relieve the Contractor from any damages or liability which may arise during or after such precautions have been taken by the Owner.

I. SUSPENSION OF WORK

The Owner may at any time suspend the work, or any part thereof by giving written notice to the Contractor. The work shall resume by the Contractor on a date fixed in a written notice from the Owner to the Contractor. If such stoppage is due to no fault of the Contractor, and not otherwise authorized by other provisions of the Contract Documents, the Owner shall reimburse the Contractor for reasonable expenses and adjust the time allowed for Contract completion; provided that there shall be no reimbursement if the period of suspension occurs after expiration of the time allowed for completion of the work, exclusive of any extension of time.

J. RIGHT OF OWNER TO TERMINATE CONTRACT

In the event that any of the provisions of the Contract Documents are violated by the Contractor or by any of his Subcontractors, the Owner may serve written notice upon the Contractor and the Surety of its intention to terminate this Contract. Such notice shall contain the reasons for intention to terminate this Contract. Unless within ten (10) days after the serving of such notice upon the Contractor, such violation shall cease or satisfactory arrangements for correction be made in writing, the Contract shall cease and terminate. In event of such termination, the Owner shall immediately serve notice thereof upon the Surety and the Contractor, and the Surety shall have the right to perform the Contract. If the Surety does not commence performance thereof within thirty (30) days from the date of the mailing to such Surety of said notice of termination, the Owner may take over the work and prosecute the same to completion by contract or force account at the expense of the Contractor, and his Surety shall be liable to the Owner for any excess cost to the Owner.

Where the Contractor has failed to complete minor items of work within the time set for completion of the Contract, but limited to cases where the value of such minor work does not exceed five percent (5%) of the total construction cost of the work, the Owner shall have the right, without terminating this Contract, of completing said items of work and then deducting from the sums due the Contractor under this Contract, the total cost incurred in completing such minor items of work. In such cases, the Owner may complete such minor items of work by force account or by employing some other Contractor. If the Owner adopts this procedure, it shall deliver to the Contractor a written statement, describing the items not completed, or imperfectly completed, and shall in such statement, demand that the Contractor complete the work in conformity with the Contract and within a time to be fixed by the Owner. If the Contractor neglects to comply within the time stated, the Owner may proceed, as herein above set forth. The time within which the Contractor shall be required to complete the items set forth in such statement will depend on the amount of time required for the performance of said work, but shall not in any event be less than ten (10) days, nor more than thirty (30) days.

K. PLACING PORTIONS OF WORK IN SERVICE

If desired by the Owner, portions of the work may be placed in service as completed, and the Contractor shall give proper access to the work for this purpose. Use and operation shall not constitute an acceptance of the total Project.

V. WORKMANSHIP, MATERIALS AND EQUIPMENT

A. WORKMANSHIP

All workmanship shall be of the highest quality, performed by persons skilled in the applicable trades, and shall be subject to the inspection, approval, or rejection by the Owner in accordance with the requirements and intent of the Contract Documents. The Owner or Architect shall have the right to order the Contractor to correct or replace unacceptable workmanship. Any other portions of the work disturbed or damaged by such correction or replacement shall be made good at the Contractor's expense.

B. INTERPRETATION OF SPECIFICATIONS AND DRAWINGS

The Technical Specifications and the Drawings are intended to be explanatory of each other. Any work indicated on the Drawings and not in the Technical Specifications, or vice versa, shall be brought to the attention of the Architect for verification of the actual intent. Contradictions of this nature not brought to the attention of the Architect for correction or verification, and acted upon by the Contractor shall be considered "At the Contractor's Risk", and if necessary, corrected by the Contractor at his expense. All work shown on the Drawings, the dimensions of which are not labeled, shall be determined by the Architect. Should it appear that the work to be done, or any of the matters relative thereto, is not sufficiently detailed or explained in these Contract Documents, including the Drawings, the Contractor shall apply to the Architect for such further explanations as may be necessary and shall conform thereto as part of this Contract. In the event of any doubt or question arising respecting the true meaning of the Contract Documents, reference shall be made to the Owner and the decisions thereon shall be final.

C. GENERAL QUALITY OF MATERIALS

Materials and equipment shall be new and of a quality equal to that specified or approved. Whenever under this Contract it is provided that the Contractor shall furnish materials or manufactured articles, or shall do work for which no detailed specifications are set forth, the materials or manufactured articles shall be approved by the Owner upon recommendation of the Architect. In general, the work performed shall be in full conformity and harmony with the intent

to secure the best standard of construction and equipment of the work as a whole or in part.

D. MATERIALS AND EQUIPMENT SPECIFIED BY NAME

Except as hereinafter otherwise provided, whenever any material or equipment is indicated or specified by patent or proprietary name, or by the name of the manufacturer, such specification shall be considered as used for the purpose of describing the material or equipment desired and shall be considered as followed by the words, "or approved equal", and the Contractor may offer any material or equipment which shall be approved by the Owner and Architect and be equal in every respect to that specified; provided, that written approval is obtained from the Owner prior to incorporation into the work.

E. APPROVAL OF MATERIALS AND EQUIPMENT

All materials and equipment offered to be furnished for the work are subject to inspection and approval or rejection by the Architect or Owner. Approval shall be obtained prior to purchase and delivery of materials and equipment to the work site.

F. DRAWINGS OF EQUIPMENT AND FABRICATED MATERIALS

As soon as possible after execution of the Contract, the Contractor shall submit to the Architect a complete listing of the manufacturers of each item of equipment or assembly fabricated off the site which he proposes to furnish on the Project, together with sufficient information, including shop assembly and detail drawings, manufacturers' specifications and performance data to demonstrate clearly that the materials and equipment to be furnished comply with the provisions and intent of the Contract Documents. If the information shows any deviation from the Contract Documents, the Contractor shall, by a statement in writing accompanying the submittal, advise the Architect of the deviation and reason. The Contractor shall also submit to the Architect shop drawings showing details of structural steel and concrete reinforcing steel, banding details, piping details, and of other items necessary for the proper installation of material into the completed work.

All drawings and details described herein, when submitted, shall bear the stamp of the Contractor and initials of his authorized representative indicating that the Contractor has reviewed and approved such drawings as meeting his interpretation of the requirements of the Contract.

The Submittal shall be made in triplicate plus the number of copies that the Contractor desires to be returned to him. Upon review, the Architect will return all but three copies, which will be stamped or marked either approved, approved subject to minor designated changes, or disapproved. In the latter case an explanation will be given as to why the material or equipment is unsatisfactory.

The Contractor shall make any indicated corrections on the drawings returned and shall resubmit corrected drawings until final approval. Approval by the Architect of shop drawings and other data submitted by the Contractor shall not relieve the Contractor from responsibility for errors or omissions therein, or for furnishing the materials and equipment of proper dimension, size, quantity, quality, and all performance characteristics to meet the requirements and intent of the Contract Documents.

The Contractor shall have no claim for damages or extension of time on account of any delay in the work resulting from the reasonable and timely rejection of material, revision and resubmittal of drawings and other data for approval.

G. SUBSTITUTIONS

If the Contractor proposes to substitute any equipment, facilities or processes in place of those specified in the Contract Documents, the Contractor shall prepare and submit to the Architect detailed drawings showing any modifications, including, but not limited to structures, reinforcing steel, piping, electrical and mechanical work, to adapt the Drawings to the alternate equipment or facilities. The Architect, with the Owner, will review such Drawings and may approve, reject, or indicate thereon changes necessary to comply with the project requirements.

H. SAMPLES

Whenever requested by the Architect or Owner, or when called for by the Contract Documents, sample or test specimens of the materials to be used or offered for use in the work shall be obtained or prepared by and at the expense of the Contractor. The samples shall be representative in all respects of the material offered or intended to be used, shall be supplied in such quantities and sizes as may be required for proper examination and tests, and shall be delivered to the Architect freight prepaid along with identification as to their sources and types or grades. All samples shall be submitted and approved before shipment of the material to the work site.

No materials or equipment of which samples are required to be submitted for approval shall be incorporated into the work until such approval has been given by the Architect.

I. TESTS

Unless otherwise stipulated in the Contract Documents, all testing required shall be provided by and at the sole expense of the Contractor. All laboratory tests required shall be made by a testing laboratory approved by the Owner.

All tests shall be performed in accordance with specific procedures identified in the Contract Documents, or if not therein specified, they shall be performed in accordance with applicable recognized standard practice. Reports of tests provided by the Contractor shall be promptly submitted to the Architect and the Owner, or if provided by the Architect, copies shall be promptly submitted to the Contractor.

The Contractor shall give the Architect and the Owner sufficient notice of the time and place of any test to be made at the point of manufacture, assembly or fabrication in order that the Architect or the Owner may witness the test.

J. MATERIAL TESTS

All materials incorporated in the work shall be subject to inspection and test as follows: All tests, except as noted, shall be made by a laboratory, employed and paid for by the Contractor. The laboratory shall be approved by the Owner prior to being retained by the Contractor. Samples at the place of manufacture shall be taken by a representative of the laboratory. Samples of construction materials from the site of the work, such as sand, gravel, concrete cylinders, and pipes for which laboratory tests are required, shall be taken, assembled or prepared on the site of the work by representatives of the laboratory or Owner. Signed copies of test reports on laboratory forms or letterheads shall be delivered to the Architect as soon as available.

K. STORAGE OF MATERIALS & EQUIPMENT

Materials shall be stored so as to ensure the preservation of their quality and fitness for the work and to allow access for proper inspection.

L. OPERATING AND MAINTENANCE DOCUMENTATION

Before final acceptance of the work, the Contractor shall deliver to the Architect a complete set of suitable operating and maintenance instructions and parts list documentation for each piece of equipment or equipment assembly. These instructions and lists shall be assembled in an orderly arrangement and shall be accompanied by a tabulation of the information provided for each item of equipment.

M. COMPLIANCE WITH STATE SAFETY CODE

All necessary machinery guards, railings, and other protective devices and equipment shall be provided as specified by the OSHA, or other regulatory agencies or departments.

VI. EXECUTION OF WORK

A. EQUIPMENT AND METHODS

The work under the Contract shall be prosecuted with all materials, tools, machinery, apparatus and labor, and by such methods as are necessary to complete the work. If at any time, any part of the Contractor's plant or equipment or any of his methods of execution of the work appear to the Owner or the Architect to be unsafe, inefficient or inadequate to insure the required quality or rate of progress of the work, he may order the Contractor to increase or improve his facilities or methods and the Contractor shall comply promptly with such orders; but neither compliance with such orders nor failure of the Architect or Owner to issue such orders shall relieve the Contractor from his obligation to secure the degree of safety, the quality of the work and the rate of progress required. The Contractor alone shall be responsible for the safety, adequacy and efficiency of his plant, equipment and methods.

If the Contractor fails to promptly comply with the order of the Owner or Architect issued in accordance with this Paragraph, the Owner shall have the right to terminate the Contract.

B. TIME OF COMPLETION

The Contractor shall promptly begin the work under the Contract, and all portions of the project made the subject of this Contract shall begin and be so prosecuted that they shall be completed and ready for full use within the time specified elsewhere in the Contract Documents.

C. AVOIDABLE DELAYS

Avoidable delays in the prosecution or completion of the work shall include all delays which might have been avoided by the exercise of care, prudence, foresight or diligence on the part of the Contractor.

Delays in the prosecution of parts of the work, which may in themselves be unavoidable but do not necessarily prevent or delay the prosecution of other parts of the work nor the whole work within the time herein specified, will be deemed avoidable delays within the meaning of this Contract.

D. UNAVOIDABLE DELAYS

Unavoidable delays in the prosecution or completion of the work under this Contract shall include all delays which may result through causes beyond the control of the Contractor and which he could not have prevented by the exercise of care, prudence, foresight or diligence. Orders issued by the Owner changing the amount of work to be done, the quantity of materials to be furnished,

or the manner in which the work is to be prosecuted, failure of the Owner to provide rights-of-way and unforeseen delays in the completion of other contractors under contract with the Owner will be considered unavoidable delays, so far as they necessarily interfere with the Contractor's completion of the whole of the work. Delays due to adverse weather conditions, unless of an extreme nature such as hurricanes, floods, or tornados will not be regarded as unavoidable delays as the Contractor should understand that such conditions are to be expected and plan his work accordingly.

E. NOTICE OF DELAYS

Whenever the Contractor anticipates or experiences any delay in the prosecution of the work he shall immediately notify the Owner and Architect, in writing, of such delay and its cause in order that the Owner may take immediate steps to prevent, if possible, the occurrence or continuance of the delay, or, if this cannot be done, may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the work is to be delayed thereby.

After the completion of any part or the whole of the work, the Owner, in approving the amount due the Contractor, will assume that any and all delays which have occurred in its prosecution and completion have been avoidable delays, except such delays as shall have been called to the attention of the Owner at the time of their occurrence and later found by the Owner to have been unavoidable. The Contractor will make no claims that any delay not called to the attention of the Owner at the time of its occurrence has been an unavoidable delay.

F. EXTENSION OF TIME

1. UNAVOIDABLE DELAYS: For delays which are unavoidable, as determined by the Owner, the Contractor will be allowed, upon Contractor application, an extension of time beyond the time specified for completion elsewhere in the Contract Documents, proportionate to the length of such unavoidable delay. No liquidation damages or Architecting and inspection costs as are charged in the case of extensions of time for avoidable delays, will be assessed for unavoidable delays.
2. AVOIDABLE DELAYS: If the work called for under this Contract is not finished and completed in all parts and in accordance with all requirements, within the time specified for completion in the Contract Documents (including extensions of time granted because of unavoidable delay), or if at any time it shall appear to the Owner that the Contractor will be unable to finish and complete the work, the Owner may grant the Contractor such extensions of time as the Owner deems in its best interest.

If such extension of time for Avoidable Delay is not granted, the provisions of the Contract Document, at the discretion of Owner, may be followed. However, at the option of the Owner and where the delay may be of such a duration not to inflict serious injury to the operations of the Owner in regard to the project, the Owner may assess liquidated damages for each calendar day delay exceeding the contract completion date. The sum of liquidated damages on a per day basis will be stipulated in the Contract Documents.

G. UNFAVORABLE WEATHER AND OTHER CONDITIONS

During unfavorable weather and other unfavorable conditions, the Contractor shall pursue only such portions of the work as shall not be damaged thereby. No portions of the work whose satisfactory quality or efficiency will be affected by an unfavorable condition shall be constructed while these conditions exist unless by special means or precautions approved by the Owner and Architect.

VII. PAYMENTS AND CONTRACT COMPLETION

A. PROGRESS ESTIMATES AND PAYMENTS

Immediately upon execution and delivery of the Contract and before the first partial payment is made, the Contractor shall deliver to the Owner an estimated construction progress schedule in form satisfactory to the Owner, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents and the anticipated amount of each monthly payment that will become due the Contractor in accordance with the progress schedule.

No payments under the Contract will be made except upon the presentation by the Contractor of a Periodical Estimate for Payment approved by the Architect. Payment forms, supplied by the Owner, shall show that the work covered by the payments has been completed and the payments therefore are due in accordance with the Contract. Such payment forms shall be submitted to the Architect, by the Contractor, by the 25th day of a calendar month to permit review. Upon presentation of certified copies of purchase bills and freight bills, the Owner will include in such monthly estimate, payments for materials that will eventually be incorporated in the work, providing that such material is suitably stored on the work site or other Owner approved site, at the time of submission of the estimate. Such materials, when so paid for by the Owner, will become the property of the Owner and, in case of default on the part of the Contractor, the Owner may use or cause to be used by others these materials in construction of the work. However, the Contractor shall be responsible for safeguarding such materials against loss or damage of any nature whatsoever, and in case of any loss or damage, the Contractor shall replace such lost or damaged materials at no cost to the Owner.

Except as otherwise provided, the first estimate shall be of the value of the work performed and materials delivered and suitably and safely stored at the work site or other Owner approved site. Every subsequent estimate, except the final estimate, shall be for the value of the work performed and materials delivered and suitably stored since the preceding estimate was made; and provided, also, that materials delivered for the Project for which payment is included in the estimate, shall not be removed from the work site or approved storage site without the written consent of the Owner.

The estimates shall be signed by the Architect and approved by the Owner, and after such approval, the Owner, subject to the foregoing provisions, will pay or cause to be paid to the Contractor, in the manner provided by law, an amount equal to ninety percent (90%) of the estimated value of the work performed and the full value of the materials furnished, delivered, unused and suitably and safely stored as provided above.

B. ALTERATIONS, OMISSIONS AND EXTRA WORK

The Owner reserves the right to increase or decrease by 15% the quantity of any item or portion of the work, or to omit portions of the work as may be deemed necessary or advisable by the Owner and, also, to make such alterations or deviations, additions to, or omissions as may be deemed necessary during the progress of the work. Upon written order of the Owner, the Contractor shall proceed with the work as increased, decreased or altered.

The Architect is authorized to order, on behalf of the Owner, minor changes in the work which do not involve extra cost or an extension of time to the Contract and which does not change the character of the work. The Architect is not authorized to order any other changes, alterations, omissions, additions, or extra work unless the same is approved by a written Change Order properly authorized in writing by the Owner. No claim of Contractor for extra compensation because of any change, alteration, omission, addition or extra work shall be paid or be payable

unless a written order to the same change is signed by the Owner.

All adjustments, if any, in the Contract Price to be paid to Contractor because of any such change, alteration, deletion, addition, or extra work shall be made only to the extent and in the manner provided in the Contract Documents. Such alteration shall in no way affect, vitiate, or make void this Contract or any part thereof, except that such is necessarily affected by such alterations and is clearly the evident intention of the parties to this Contract. Any such work performed by the Contractor prior to execution of the Change Order by the Owner shall be at the risk of the Contractor. In case of neglect or refusal by the Contractor to perform any extra work which may be authorized by the Owner, the Owner may employ any person or persons to perform such work and the Contractor shall not in any way interfere with the person or persons so employed.

When any changes decrease the amount of work to be done, such changes shall not constitute a basis or reason for any claim by Contractor for extra compensation or damages on account of any anticipated profits which he thereby loses on the omitted work, and Contractor shall not be entitled to any compensation or damages therefore.

C. OWNER'S RIGHT TO WITHHOLD CERTAIN AMOUNTS

The Owner may withhold from payments to the Contractor, in addition to the retained percentage, such an amount or amounts as may be necessary to cover:

1. Payments that may be earned or due for just claims for labor or materials furnished in and about the work.
2. Defective work not remedied.
3. Failure of the Contractor to make proper payments to a subcontractor.
4. Reasonable doubt that this Contract can be completed for the balance then unpaid.
5. Damage to another Contractor, where there is evidence thereof.
6. The Contractor's failure to resolve bodily injury or property damage claims of any person or entity.

The Owner will have the right to act as agent for the Contractor in disbursing such funds as have been withheld, pursuant to this Paragraph, to the party or parties who are entitled to payment there from. The Owner shall render to the Contractor a proper accounting of all such funds disbursed in behalf of the Contractor.

The Owner also reserves the right to refuse payment of the final estimate due to the Contractor until it is satisfied that all subcontractors, material suppliers, and employees of the Contractor have been paid in full.

D. UNIT PRICE CONSTRUCTION ITEMS

No work shall be performed by the Contractor on any unit price items beyond the quantity as set forth in the Contract, unless specifically approved by the Owner and directed by the Architect in writing to do so. It is anticipated that the quantities as set forth for such unit price items are reasonable and that said quantities will not be exceeded by more than 10%. The Contractor shall carefully study the Contract Documents to determine the extend and scope of the work included under lump sum items in the Contract. It may be that work under some of such unit price items is in addition to similar work to be performed under lump sum items and paid for thereunder.

E. COMPENSATION FOR EXTRA WORK AND WORK OMITTED

Whenever corrections, additions, or modifications in the work under this Contract change the

amount of work to be performed or the amount of compensation due the Contractor, the Owner will have prepared a written Change Order, setting forth the extra work to be performed or work omitted. Such a Change Order will also set forth the method of computing the added or reduced compensation to be due the Contractor. The method of computing the added or reduced compensation to be due the Contractor. The method of computing the added or reduced compensation will be determined under one or more of the following methods as selected by the Owner:

1. By Unit Price contained in the Contractor's original Proposal and incorporated in the Contract with a change in quantity.
2. By a supplemental schedule of prices contained in the Contractor's original Proposal and incorporated in the Contract.
3. By an acceptable lump sum of the following five items as full and proper compensation:
 - a. The necessary reasonable cost to the Contractor of the material required for the work as furnished and delivered by the Contractor at the site of the work.
 - b. The necessary cost to the Contractor of the labor required to incorporate all of said material into the work and to finish the work in accordance with directions.
 - c. The necessary reasonable cost to the Contractor for the use of equipment used for the work.
 - d. The cost of Workers' Compensation, insurance premiums, State Unemployment and Federal Social Security payments on the labor included in Item (b).
 - e. Fifteen percent (15%) of the sum of items (a), (b), (c), and (d), which shall be considered as covering all other expenses and profit.

Under method (3) described above, in order that a proper determination may be made by the Architect of the cost of labor and materials incorporated into extra work, the Contractor shall furnish weekly an itemized statement of material and labor supplied, together with the cost vouchers for quantities and prices of such labor, materials or work. In the event the Contractor fails to comply with the above provisions, no claim for compensation shall be made against the Owner.

F. ACCEPTANCE OF WORK

The work will be accepted in writing by the Owner when completed in accordance with the terms of the Contract Documents as verified by the Architect. Such acceptance, however, will be predicated upon the approval of State and/or Federal regulatory agencies having concurrent jurisdiction on the work or worksite.

G. FINAL ESTIMATE AND PAYMENT

The Contractor shall, as soon as practicable after the final acceptance of the work under this Contract, submit a final estimate for payment.

Such final estimate shall be checked, approved and signed by the Architect and the Owner. After such approval, the Owner shall pay or cause to be paid to the Contractor the entire sum found to be due after deducting therefrom all previous payments and amounts as the terms of the Contract prescribe.

Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall deliver to the Owner a complete release of all claims or liens arising out of this Contract and an affidavit that, so far as he has knowledge or information, the release includes all the labor and materials for which a lien or claim could be filed. The Contractor may, if a Subcontractor refuses to furnish a release in full, furnish a bond satisfactory for the full amount of

the Subcontractor's lien to the Owner indemnifying the Owner against any claim or lien. If any claim or lien remains unsatisfied after all payments are made, the Contractor shall reimburse the Owner all money that it may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

END OF GENERAL PROVISIONS OF CONTRACT

SECTION 0650

ARCHITECT'S SUPPLEMENTARY CONDITIONS

- 1.01 PROJECT DESCRIPTION: The work includes the construction of a New HVAC System for Myrtle Beach Law Enforcement Center Special Operation Building for the City of Myrtle Beach.
- 1.02 DEFINITIONS:
- A. Owner: City of Myrtle Beach
Post Office Drawer 2468
Myrtle Beach, S.C. 29578
 - B. Architect: Pike – McFarland – Hall Associates, Inc.
1300 Professional Drive, Suite 201
Myrtle Beach, SC 29577
- 1.03 PERFORMANCE & PAYMENT BONDS: Will be for 100 percent (100%) of the contract and shall be in force from the contract award date until the end of the warranty period. The Bond forms in the contract documents will be used to execute the required bonds unless otherwise approved by the Architect.
- 1.04 BID BOND: Will be for 5 percent (5%) of the Contractor's Bid and will be in force for a period of ninety (90) calendar days following the Bid closing date. The bond form in the Contract Documents will be used to execute the required bond unless otherwise approved by the Architect.
- 1.05 SCOPE OF WORK: All work is within the existing Special Operation Building at the Myrtle Beach Law Enforcement Center located at 1101 North Oak Street in Myrtle Beach, South Carolina and consists of 1) replacing the existing Administration Area split-system heat pump in its entirety, 2) condition the Evidence Storage Area with a new split-system heat pump system, and 3) improve ventilation of the Warehouse Area with a new exhaust fan and louvers. The work also includes extend perimeter walls to seal the storage areas from the metal building exterior walls and from the open bay, provide insulation in all perimeter walls of the storage areas to prepare for conditioning and add roof insulation to the existing compressed insulation in the bay over the storage area.
- 1.06 EVALUATION OF BIDS: Will be based on the information to be included with the Bid Proposal. The final decision will be based on the bid coupled with acceptable references and other applicable information regarding the past performance of the Contractor, Project Superintendent and Subcontractors on projects of comparable importance, scope, magnitude and urban environment. Regard as to timely completion of project is extremely important.
- 1.07 PLANS & SPECIFICATIONS: The Contractor will receive five (5) sets of plans and specifications to complete the work.
- 1.08 CONSTRUCTION STAKE OUT:
- A. Alignment and Control: The Architect will provide a base line for construction alignment and a bench mark for the elevation datum.
 - B. Stake Out: The Contractor shall furnish and perform all construction stake out from the Control Points furnished, and shall be totally responsible to construct the work in accordance with the plans and specifications. The Architect's checking of grade and offset stake out shall in no way relieve the Contractor of this responsibility.

- 1.09 **WORK SCHEDULE:** The Contractor shall, upon notice of award, or as otherwise requested, furnish the Architect a job schedule showing the various components of work and the anticipated beginning and completion date for each particular phase of the project.
- 1.10 **SUPERINTENDENCE AND CONTROL BY CONTRACTOR:** The Contractor shall provide a full time project superintendent at the job site, acceptable to the Architect, who shall have full authority to act for the Contractor. They shall be fully responsible to maintain the activities of any and all subcontractors on the job and to respond to job instruction from the Architect and Owner.
- 1.11 **CONTRACTOR'S AND SUBCONTRACTOR'S PUBLIC LIABILITY, VEHICLE LIABILITY AND PROPERTY DAMAGE INSURANCE:** For Contractor Insurance Requirements, see General Provision – Contractor's Insurance, Section I.D.
- 1.12 **OTHER UTILITIES:** Other utilities may be encountered during construction activities and should be anticipated. The Contractor shall contact utility representatives to determine the exact locations of all existing facilities and underground utilities and shall make every effort to avoid damage to such. Exploratory hand excavation prior to machine excavation should be done to avoid damage to existing facilities.
- 1.13 **STATE HIGHWAY ENCROACHMENT:** The Owner will obtain encroachment permit agreements for all work located in the public rights-of-way, if required. All operations, trenching, pavement butting and repair will be coordinated with the appropriate public agency where such work affects public property. All requirements of these permits shall be performed by the Contractor as though the permits were issued in the name of the Contractor. A copy of the permit will be provided to the Contractor upon request.
- 1.14 **RECORD DRAWINGS:** The Contractor shall keep a complete record of variations between contract drawings and specifications requirements and the actual project installation. One (1) set of drawings shall be marked in red by the Contractor showing such variations and delivered to the Architect upon completion of the project. Contractor shall also locate all fittings and valves by measurement from two (2) permanent points in the vicinity and provide information on the record drawings.
- 1.15 **REQUIRED RECORDS ON SALES AND USE TAX:** In order that the Owner may substantiate a refund claim for sales and use taxes, the Contractors shall furnish certified statements in triplicate, setting forth the cost of construction materials, supplies and fittings, and equipment which becomes a part of, or are annexed to any building or structure being erected, altered, or repaired under contract, with the Owner and the amount of sales and/or use taxes paid thereon.
- 1.16 **EXISTING CONDITIONS:** The Contractor, in submitting a proposal and in signing this contract, acknowledges that he has thoroughly investigated the existing conditions and has examined the plans and specifications, understanding clearly their requirements and the requirements necessary to construct all to completion the improvements contracted for; that he is fully prepared to sustain all losses and damages incurred by the actions of elements; is prepared to provide all necessary tools, appliances, machinery, skilled and unskilled workmen, and all necessary materials to successfully complete the work. The Contractor should be hereby made aware that he is responsible for working the subgrade by disking, cutting, rolling, mixing or whatever means necessary to obtain desired compaction. If the Contractor has made the necessary efforts to bring said subgrade to compaction, and in the opinion of the Architect, the subgrade is unsuitable, the Contractor shall be authorized to muck and backfill these areas.
- 1.17 **SITE DRAINAGE:** The Contractor is hereby made aware that it shall be the responsibility of the Contractor to provide positive drainage on the site during construction. Temporary drainage ditches, swales or piping required for this purpose must be approved by the Architect and by the

Owner before construction and must be constructed so as not to interfere with traffic, pedestrian and/or vehicular. The cost of de-watering shall be included in the various unit prices stated in the proposal. No additional payment will be made for this work.

- 1.18 SOILS REPORTS: It shall be the Contractor's responsibility to confirm soil conditions and water table on the site by taking his own samples. This work shall be coordinated with the Owner prior to bidding the project.
- 1.19 PROJECT SCHEDULE: The Contractor is hereby made aware that time is of the essence in that the timely completion of the work is essential. The Contractor is also made aware that the Owner has priorities in the completion of the work. All that work shown in the Contract Documents must be completed and accepted within one-hundred twenty (120) calendar days. In the event that the Contractor does not complete the project in the prescribed time, he agrees to pay liquidated damages in the sum of \$100.00 for each consecutive calendar day thereafter.
- 1.20 SUBSTANTIAL COMPLETION: After the Contractor deems that the project currently under construction is complete, the Contractor shall request a walk-through inspection of the project with the Architect and Owner. During the walk-through, the Architect will compile a list of items to be addressed in order for the project to be deemed substantially complete. Upon completion of the listed items, the Contractor shall invite the Architect back to the job site to verify the completion of all of the items on the list.
- If all items have been completed to the Architect's satisfaction, the project will be considered substantially complete. If additional work is required to complete, the items identified on the list, or if the quality of the work is not approved by the Architect, then the Contractor shall correct the deficient work to the satisfaction of the Architect, at which point the project shall be substantially complete. If additional items are identified that did not appear on the original list, these items will be added to the final completion check list, and not held against the Contractor's effort to substantially complete the project.
- 1.21 ENVIRONMENTAL REGULATIONS: Contractor is responsible for ensuring that his forces comply with environmental regulations on site. Should construction forces violate laws, ordinances or regulations causing delays or adverse consequences on the site, the Contractor shall be held responsible for said actions.
- 1.22 UNIT PRICES: Unit prices in the bid package are to be used only in paying for items by the unit installed, constructed and completed for periodic payment purposes and for preparing change orders.
- 1.23 LIST OF DRAWINGS: The list of drawings is included in the Index.
- 1.24 CONSTRUCTION STAGING AREA: The Construction Staging Area for this Project will be located at the discretion of the Contractor with prior written consent by the Owner.
- 1.25 RESOLUTION OF CLAIMS AND DISPUTES: The Architect will review claims and take one or more of the following preliminary actions within ten (10) calendar days of receipt of a claim: (1) Request additional supporting data from the claimant; (2) Submit a schedule to the parties indicating when the Architect expects to take action; (3) Reject the claim in whole or in part, stating the reason for rejection; (4) Recommend approval of claim by the other party or (5) Suggest a compromise. The Architect may also, but is not obligated to, notify the surety, if any, of the nature and amount of the claim.

If a claim has been resolved, the Architect will prepare or obtain appropriate documentation.

If a claim has not been resolved, the party making the claim shall, within ten (10) days after the Architect's preliminary response, take one (1) or more of the following actions: (1) Submit additional supporting data requested by the Architect; (2) Modify the initial claim or (3) Notify the Architect that the initial claim stands.

If a claim has not been resolved after consideration of the foregoing and of further evidence presented by the parties or requested by the Architect, the Architect will notify the parties in writing that the Architect's decision will be made within seven (7) days, which decision shall be final and binding on the parties but subject to resolution through the South Carolina judicial system. Upon expiration of such time period, the Architect will render to the parties the Architect's written decision relative to the claim, including any change in Contract Sum or Contract Time or both. If there is a surety and there appears to be a possibility of a Contractor's default, the Architect may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

When functioning as interpreter and judge under the preceding paragraphs, the Architect will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

- 1.26 **WARRANTY:** The warranty period shall start upon final acceptance of all work as prescribed for in the Contract Documents.
- 1.27 **CONFLICT OF INTEREST:** No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make accept or approve, or to take part in negotiation, making, accepting or approving any architectural, engineering, inspecting, construction, or material supply contract, or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof. No officer, employee, engineer, attorney, Architect, or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner who is in any legislative, executive, supervisory, or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.
- 1.28 **WATER AND POWER SUPPLY:** The Owner shall provide a source of water and power on the project site. It shall be the Contractor's responsibility to convey the necessary water and power to any location at which it is required on the project.
- 1.29 **STATE AND LOCAL PERMITS, LICENSE INSPECTIONS, CERTIFICATIONS:** The Contractor shall obtain such required documents and pay the fees assessed for work for which licenses and inspections are required. The Contractor and all subcontractors shall also obtain and pay the fees for City business licenses. The building permit fee and any utility impact and tap fees for this project has been waived by the Owner.
- 1.30 **SAFETY REGULATIONS:** All methods of construction including, but not limited to, trenching, sheeting and bracing shall be done in accordance with OSHA regulation. As this work will occur in and around a continually operated facility where staff, vendors and the public are present, the Contractor will be charged with maintaining safe and secure construction activities that protect the health, safety and welfare of ALL occupants for the life of the project.
- 1.31 **PROTECTION OF WORK:** The Contractor shall furnish and install all necessary temporary devices for the protection of the work and the site occupants, including barricades, warning signs and lights at night.

- 1.32 EMERGENCY WORK: The Contractor at all times (nights, weekends or holidays) shall have a responsible person available whom the Owner may contact in the event emergency repairs become necessary. Upon notification of such emergency work, the Contractor's representative shall immediately take steps to make such repairs that may be required
- 1.33 OCCUPYING PRIVATE LAND: The Contractor shall not (except after written consent from the proper parties) enter or occupy the men, tools, or materials any land outside the right-of-way or property of the Owner. A copy of the written consent shall be given to the Architect.
- 1.34 ESCALATION: No provision for price escalation is included in the project. Contractor shall be solely responsible for any cost of materials increases or other cost increases that may occur after bids have been submitted. The Owner will be under no obligation to consider Contractor justifications of any increase in cost of materials, etc...

END OF SECTION

DOCUMENT 00700 – CONTRACT FORMS AND SUPPLEMENTS

AGREEMENT FOR

**A NEW HVAC SYSTEM FOR
MYRTLE BEACH LAW ENFORCEMENT CENTER
SPECIAL OPERATION BUILDING**

This AGREEMENT, made this _____ day of _____, 20____, by and between City of Myrtle Beach, hereinafter called "OWNER", and _____ doing business as (an individual,) or (a partnership,) or (a corporation) hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The CONTRACTOR will commence and complete the construction of: A NEW HVAC SYSTEM FOR MYRTLE BEACH LAW ENFORCEMENT CENTER SPECIAL OPERATION BUILDING, herein after called "PROJECT".
2. The CONTRACTOR will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the PROJECT described herein.
3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within Ten (10) calendar days after the date of the NOTICE TO PROCEED and will complete the same within one-hundred twenty (120) calendar days, or unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS.
4. The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS and comply with the terms therein for the sum of _____ Dollars (\$) _____) or as shown in the BID form.
5. The term "CONTRACT DOCUMENTS" means and includes the following:
 - A. Instructions to Bidders
 - B. Bid Forms
 - C. Proposal
 - D. Bid Bond
 - E. Agreement
 - F. General Provisions
 - G. Architect's Supplementary Conditions
 - H. Contract Forms - Payment/Performance Bonds
 - Insurance Certificates
 - Tentative Notice of Award
 - Notice of Award
 - Notice to Proceed
 - Change Orders
 - I. GENERAL REQUIREMENTS prepared or issued by:
Pike – McFarland – Hall Associates, Inc.

- J. TECHNICAL SPECIFICATIONS prepared or issued by:
Pike – McFarland – Hall Associates, Inc.
 - K. ADDENDA:
No. _____, dated _____
No. _____, dated _____
No. _____, dated _____
 - L. CONTRACT DRAWINGS prepared by Pike – McFarland – Hall Associates, Inc.,
numbered as noted on the cover sheet.
6. The OWNER will pay to the CONTRACTOR in the manner and at such times and in such amounts as required by the CONTRACT DOCUMENTS.
 7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.
 8. CONTRACTOR agrees to commence WORK under the contract on or before a date specified in the NOTICE TO PROCEED and to fully complete the PROJECT within one-hundred twenty (120) calendar days. CONTRACTOR further agrees to pay as liquidated damages, the sum of \$100.00 for each consecutive calendar day thereafter as provided in the Contract Document.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in four (4) counter parts, each of which shall be deemed an original on the date first above written.

CITY OF MYRTLE BEACH:

BY: _____

Name: _____

Title: _____

(SEAL)

ATTEST:

TITLE: _____

BY: _____

Name: _____

Title: _____

(SEAL)

ATTEST:

TITLE: _____

DOCUMENT 00700A

TENTATIVE NOTICE OF AWARD

To: _____

PROJECT Description: A NEW HVAC SYSTEM FOR
MYRTLE BEACH LAW ENFORCEMENT CENTER
SPECIAL OPERATION BUILDING

The OWNER has reviewed the BID submitted by you for the above described WORK in response to its Invitation for Bids and Instructions to Bidders.

You are hereby notified that your BID has been TENTATIVELY accepted for items in the amount of \$ _____, contingent upon your timely performance of the following:

You are required by the Instruction to Bidders to execute the Agreement and furnish the required CONTRACTOR'S PERFORMANCE BOND, PAYMENT BOND, and CERTIFICATES OF INSURANCE within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this TENTATIVE NOTICE OF AWARD to the OWNER within seventy-two (72) hours of receipt.

Dated this _____ day of _____, 20____.

Owner: CITY OF MYRTLE BEACH

By: _____

Title: _____

ACCEPTANCE OF TENTATIVE NOTICE OF AWARD
Receipt of the above TENTATIVE NOTICE OF AWARD is hereby acknowledged

By: _____

This the _____ day of _____, 20____.

By: _____ Title: _____

DOCUMENT 00700B

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____ (Name of Contractor)

_____ (Address of Contractor)

a _____ hereinafter called Principal, and
(Corporation, Partnership or Individual)

_____ (Name of Surety)

_____ (Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

_____ (Name of Owner)

_____ (Address of Owner)

hereinafter called OWNER, in the penal sum of _____ Dollars,
(\$ _____) in lawful money of the United States, for the payment of which sum well and
truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these
presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain
contract with the OWNER, dated the _____ day of _____, 20____, a copy of
which is hereto attached and made a part hereof for the construction of:

**A NEW HVAC SYSTEM FOR
MYRTLE BEACH LAW ENFORCEMENT CENTER
SPECIAL OPERATION BUILDING**

NOW, THEREFORE if the Principal shall promptly make payment to all persons, firms,
SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of
the WORK provided for in such contract, and any authorized extension or modification thereof, including
all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment
and tools, consumed or used in connection with the construction of such WORK whether by
SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and
effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no
change, extension of time, alteration or addition to the terms of the contract or to the WORK to be
performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its
obligation on this BOND, and it does hereby waive notice of any such change, extension of time,
alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall
abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of

which shall be deemed an original, this the _____ day of _____, 20 ____.

ATTEST:

(Principal) Secretary

[SEAL]

Principal

By _____(S)

(Address)

Witness as to Principal

(Address)

Surety

ATTEST:

By _____
Attorney-in-Fact

Witness as to Surety

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract.
If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

DOCUMENT 00700C

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____ (Name of Contractor)

_____ (Address of Contractor)

a _____ hereinafter called Principal, and
(Corporation, Partnership, or Individual)

_____ (Name of Surety)

_____ (Address of Surety)

hereinafter called SURETY, are held and firmly bound unto _____

_____ (Name of Owner)

_____ (Address of Owner)

hereinafter called OWNER, in the penal sum of _____
_____ Dollars, (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 20____, a copy of which is hereto attached and made a part hereof for the construction of:

**A NEW HVAC SYSTEM FOR
MYRTLE BEACH LAW ENFORCEMENT CENTER
SPECIAL OPERATION BUILDING**

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no

change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, this the _____ day of _____, 20 ____.

ATTEST:

Principal

[SEAL]

By _____(s)
(Principal) Secretary

(Address)

(Witness as to Principal)

(Address)

Surety

ATTEST:

By _____
Attorney-in-Fact

(Surety) Secretary

[SEAL]

Witness as to Surety

(Address)

(Address)

NOTE: Date of Bond must not be prior to date of Contract.

If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the PROJECT is located.

DOCUMENT 00700D

NOTICE TO PROCEED

To: _____

Date: _____

Project: A New HVAC System for Myrtle
Beach Law Enforcement Center
Special Operation Building

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 20_____, on or before _____, 20_____, and you are to complete the work within one-hundred twenty (120) consecutive calendar days thereafter.

The date of completion of all WORK is therefore _____, 20_____.

The City of Myrtle Beach
Owner

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

this the _____ day of _____, 20_____.

By _____

Title _____

CHANGE ORDER

Order No. _____
Date: _____
Agreement Date: _____

NAME OF PROJECT: **A New HVAC System for Myrtle Beach Law Enforcement Center Special
Operation Building**

OWNER: **City of Myrtle Beach**

CONTRACTOR: _____

The following changes are hereby made to the CONTRACT DOCUMENTS:

Justification:

Change to CONTRACT PRICE:

Original CONTRACT PRICE:	\$ _____.
Current CONTRACT PRICE adjusted by previous CHANGE ORDER:	\$ _____.
The CONTRACT PRICE due to this CHANGE ORDER will be (increased) (decreased) by:	\$ _____.
The new CONTRACT PRICE including this CHANGE ORDER will be:	\$ _____.

Change to CONTRACT TIME:

The CONTRACT TIME will be (increased) (decreased) by _____ calendar days.

The date for completion of all work will be _____ (Date).

Approvals Required:

To be effective this Order must be approved by the funding agency if it changes the scope or objective of the PROJECT, or as may otherwise be required by the GENERAL PROVISIONS or ARCHITECT'S SUPPLEMENTARY CONDITIONS.

Recommended: _____
Construction Manager

Approved: _____
Architect

Agreed To: _____
Contractor

Authorized: _____
Owner

Agency(ies) Approval(s): _____
(Where applicable): _____

SECTION 01010 – SUMMARY OF WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Project consists of a New HVAC System for the Myrtle Beach Law Enforcement Center Special Operation Building for the City of Myrtle Beach.
- B. Project location is in Myrtle Beach, South Carolina and as described in Contract Documents.
- C. Contract Documents, dated May 2017 were prepared for the Project by PIKE - McFARLAND - HALL Associates, Inc., 1300 Professional Drive, Suite 201, Myrtle Beach, SC 29577.
- D. The Work consists of:
 - 1. Replacing the existing Administration Area split-system heat pump in its entirety.
 - 2. Condition the Evidence Storage Area with a new split-system heat pump system.
 - 3. Improve ventilation of the Warehouse Area with a new exhaust fan and louvers.
 - 4. The work also includes extend perimeter walls to seal the storage areas from the metal building exterior walls and from the open bay, provide insulation in all perimeter walls of the storage areas to prepare for conditioning and add roof insulation to the existing compressed insulation in the bay over the storage area.
- E. General: During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises is limited only by the Owner's right to perform work or to retain other contractors on portions of the Project. Project is located on City property with existing structures currently in use.

1.3 OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - 1. Obtain a Certificate of Occupancy from local building officials prior to Owner occupancy.
 - 2. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain mechanical and electrical systems serving occupied portions of the building.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01010

SECTION 01027 – APPLICATIONS FOR PAYMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
- B. Note, each project of a multi-project contract shall require separate individual pay applications and separate schedule of values.
- C. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Schedules: The Contractor's Construction Schedule and Submittal Schedule are specified in Division 1 Section 01300 - "Submittals" and Section 01311 – "Schedules and Reports".

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - a. Contractor's Construction Schedule.
 - b. Application for Payment forms, including Continuation Sheets.
 - c. List of subcontractors.
 - d. Schedule of allowances.
 - e. Schedule of alternates.
 - f. List of products.
 - g. List of principal suppliers and fabricators.
 - h. Schedule of submittals.
 - 2. Submit the Schedule of Values to the Architect at the earliest possible date but no later than 7 days before the date scheduled for submittal of the initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish the format for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Architect.
 - c. Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.
4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.
6. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Margins of Cost: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
 1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B. Payment-Application Times: The date for each progress payment is the 25th day of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 15 days prior to the date for each progress payment.
- C. Payment-Application Forms: Use AIA Document G702 and Continuation Sheets G703 as the form for Applications for Payment.
- D. Application Preparation: Complete every entry on the form. Include notarization and execution by a person authorized to sign legal documents on behalf of the Contractor. The Architect will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and the Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to the Architect by a method ensuring receipt within 24 hours. All copies shall be complete, including waivers of lien and similar attachments, when required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.
- F. Waivers of Mechanics Lien: With the Final Application for Payment, submit waivers of mechanics lien from every entity who is lawfully entitled to file a mechanics lien arising out of the Contract and related to the Work covered by the payment.
- G. Initial Application for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment, include the following:
1. List of subcontractors.
 2. List of principal suppliers and fabricators.
 3. Schedule of Values.
 4. Contractor's Construction Schedule (preliminary if not final).
 5. Schedule of principal products.
 6. Schedule of unit prices.
 7. Submittal Schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from governing authorities for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction meeting.
 14. Certificates of insurance and insurance policies.
- H. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.
1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 2. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals.
 - b. Warranties (guarantees) and maintenance agreements.
 - c. Test/adjust/balance records.
 - d. Maintenance instructions.
 - e. Meter readings.
 - f. Startup performance reports.
 - g. Changeover information related to Owner's occupancy, use, operation, and maintenance.
 - h. Final cleaning.
 - i. Application for reduction of retainage and consent of surety.
 - j. Advice on shifting insurance coverages.
 - k. Final progress photographs.
 - l. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

- I. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include the following:
1. Completion of Project closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Ensure that unsettled claims will be settled.
 4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
 5. Transmittal of required Project construction records to the Owner.
 6. Removal of temporary facilities and services.
 7. Removal of surplus materials, rubbish, and similar elements.
 8. Change of door locks to Owner's access.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01027

SECTION 01035 – MODIFICATION PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittals" for requirements for the Contractor's Construction Schedule.
 - 2. Division 1 Section "Applications for Payment" for administrative procedures governing Applications for Payment.
 - 3. Division 1 Section "Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 MINOR CHANGES IN THE WORK

- A. The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on AIA Form G710, Architect's Supplemental Instructions.

1.4 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: The Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
 - 2. Within 20 days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review.
 - a. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
- B. Contractor-Initiated Proposals: When latent or unforeseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.
 - 1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.

2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Comply with requirements in Section "Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Change Order Proposal Requests.

1.5 ALLOWANCES

A. Allowance Adjustment: For allowance-cost adjustment, base each Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place. Where applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in the purchase amount only where indicated as part of the allowance.
2. When requested, prepare explanations and documentation to substantiate the margins claimed.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or the Contractor's handling, labor, installation, overhead, and profit. Submit claims within 21 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. The Owner will reject claims submitted later than 21 days.

1.6 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. The Construction Change Directive contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.7 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Proposal Request, the Architect will issue a Change Order for signatures of the Owner and the Contractor on AIA Form G701.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01035

MODIFICATION PROCEDURES

SECTION 01040 – COORDINATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Cleaning and protection.

- B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Project Meetings" for progress meetings, coordination meetings, and preinstallation conferences.
2. Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
3. Division 1 Section "Materials and Equipment" for coordinating general installation.
4. Division 1 Section "Contract Closeout" for coordinating contract closeout.

1.3 COORDINATION

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.
4. Schedule and coordinate "pre-installation" conferences as referenced throughout other sections of these specifications and as necessary to coordinate installation and interfacing of work with all other work prior to installation of work, refer to Specification Section 01200 – Project Meetings.

- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project closeout activities.

1.4 SUBMITTALS

- A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.
1. Show the relationship of components shown on separate Shop Drawings.
 2. Indicate required installation sequences.
 3. Comply with requirements contained in Section "Submittals."
- B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
1. Excessive static or dynamic loading.
 2. Excessive internal or external pressures.
 3. Excessively high or low temperatures.
 4. Thermal shock.
 5. Excessively high or low humidity.
 6. Air contamination or pollution.
 7. Water or ice.
 8. Solvents.
 9. Chemicals.
 10. Light.
 11. Radiation.
 12. Puncture.
 13. Abrasion.
 14. Heavy traffic.
 15. Soiling, staining, and corrosion.
 16. Bacteria.
 17. Rodent and insect infestation.
 18. Combustion.
 19. Electrical current.
 20. High-speed operation.
 21. Improper lubrication.
 22. Unusual wear or other misuse.
 23. Contact between incompatible materials.
 24. Destructive testing.
 25. Misalignment.
 26. Excessive weathering.
 27. Unprotected storage.
 28. Improper shipping or handling.
 29. Theft.
 30. Vandalism.

END OF SECTION 01040

SECTION 01045 – CUTTING AND PATCHING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for cutting and patching.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Coordination" for procedures for coordinating cutting and patching with other construction activities.
 - 2. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - a. Requirements of this Section apply to mechanical and electrical installations. Refer to Divisions 15 and 16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

1.3 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
 - 1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
 - 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 - 3. List products to be used and firms or entities that will perform Work.
 - 4. Indicate dates when cutting and patching will be performed.
 - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 - 6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
 - 7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
 - 1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:

- a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.
 - e. Lintels.
 - f. Timber and primary wood framing.
 - g. Structural decking.
 - h. Stair systems.
 - i. Miscellaneous structural metals.
 - j. Exterior curtain-wall construction.
 - k. Equipment supports.
 - l. Piping, ductwork, vessels, and equipment.
 - m. Structural systems of special construction.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment.
 - b. Air or smoke barriers.
 - c. Water, moisture, or vapor barriers.
 - d. Membranes and flashings.
 - e. Fire protection systems.
 - f. Noise and vibration control elements and systems.
 - g. Control systems.
 - h. Communication systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.
1. If possible retain the original Installer or fabricator to cut and patch the exposed Work listed below as required for this project. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.
 - a. Processed concrete finishes.
 - b. Stonework and stone masonry.
 - c. Ornamental metal.
 - d. Matched-veneer woodwork.
 - e. Preformed metal panels.
 - f. Firestopping.
 - g. Window wall system.
 - h. Stucco and ornamental plaster.
 - i. Acoustical ceilings.
 - j. Terrazzo.
 - k. Finished wood flooring.
 - l. Fluid-applied flooring.

- m. Carpeting.
- n. Aggregate wall coating.
- o. Wall covering.
- p. Swimming pool finishes.
- q. HVAC enclosures, cabinets, or covers.

1.5 WARRANTY

- A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

PART 2 – PRODUCTS

2.1 MATERIALS, GENERAL

- A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.

1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
 4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.
 5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
 4. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.4 CLEANING

- A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01045

SECTION 01100 – ALTERNATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 WORK INCLUDED

- A. To allow the Owner to compare total costs where alternate materials and methods might be used, and to enable the Owner's decision prior to awarding the contract, certain alternates have been established as described in this section of these specifications.
- B. The Contractor shall state in their bid the amount to be added to or deducted from their bid if the below stated alternates are accepted.

1.3 SUBMITTALS

- A. All alternates described in this section of the specifications are required to be reflected in the bid submitted on the Bid Form for this work. However, do not submit alternates other than those described in this section except as may be provided for by addenda.

1.4 PRODUCT HANDLING

- A. If the Owner elects to proceed on one or more of the alternates, make all modifications to the work required in the furnishing and installation of the selected alternate or alternates to the approval of the Architect and at no additional cost to the Owner except as proposed on the Bid Form.

PART 2 – ALTERNATE DESCRIPTIONS

2.1 CONTRACT ALTERNATES:

A. ADD ALTERNATE NO. 1 (UV LIGHTS)

- 1. Contractor shall state price difference, which would represent all labor and materials required to provide and install TRANE Air Handler SYUstem UV Light Kit in the HVAC System.

B. ADD ALTERNATE NO. 2 (IONIZATION)

- 1. Contractor shall state price difference, which would represent all labor and materials required to provide and install in the Handler Unit a Global Plasma Solutions GPS-2400 Series Air Purification/Ionization device in the HVAC System.

END OF SECTION 01100

SECTION 01140 – CONTRACTOR'S USE OF THE PREMISES

PART 1 - GENERAL

1.1 USE OF PREMISES

- A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.
 - 1. Owner Occupancy: Allow for Owner occupancy of site and use by the public.
 - 2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Use of Existing Building (if applicable): Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.
- C. Firearms are not allowed on the site.
- D. The City will relocate evidence in this work area in accordance with the Contractor on an as needed basis.
- E. Contractor is advised that due to the operations of this work area and use of this building, the Owner will have a Representative present during certain portions of work.

1.2 OCCUPANCY REQUIREMENTS

- A. Full Owner Occupancy: Owner will occupy site and existing building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations.
- B. Partial Owner Occupancy: Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - 1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 - 2. Obtain a Certificate of Occupancy from authorities having jurisdiction before Owner occupancy.
 - 3. Before partial Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain mechanical and electrical systems serving occupied portions of building.
 - 4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of building.

END OF SECTION 01140

SECTION 01200 – PROJECT MEETINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
 - 1. Preconstruction conferences.
 - 2. Preinstallation conferences.
 - 3. Progress meetings.
 - 4. Coordination meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Coordination" for procedures for coordinating project meetings with other construction activities.
 - 2. Division 1 Section "Submittals" for submitting the Contractor's Construction Schedule.

1.3 PRECONSTRUCTION CONFERENCE

- A. Schedule a preconstruction conference before starting construction, at a time convenient to the Owner and the Architect, but no later than 15 days after execution of the Agreement. Hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: Authorized representatives of the Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including the following:
 - 1. Tentative construction schedule.
 - 2. Critical work sequencing.
 - 3. Designation of responsible personnel.
 - 4. Procedures for processing field decisions and Change Orders.
 - 5. Procedures for processing Applications for Payment.
 - 6. Distribution of Contract Documents.
 - 7. Submittal of Shop Drawings, Product Data, and Samples.
 - 8. Preparation of record documents.
 - 9. Use of the premises.
 - 10. Parking availability.
 - 11. Office, work, and storage areas.
 - 12. Equipment deliveries and priorities.
 - 13. Safety procedures.
 - 14. First aid.
 - 15. Security.

- 16. Housekeeping.
- 17. Working hours.

1.4 PREINSTALLATION CONFERENCES

- A. Required for all major portions of the construction trades (i.e. sitework and grading, site utility tie-ins to public systems, underslab utilities, slab & soil treatment, landscaping, masonry, above slab utility rough-ins, windows, doors & frames, hardware, wood framing and building finishes, wood trim, building specialties, PME, etc.). Contractor is advised pre-installation conferences shall not be scheduled until approved shop drawings of materials and accessories for scheduled portions of work to discuss have been received by the General Contractor and delivered to the project site.
- B. Conduct a preinstallation conference at the Project Site before each construction activity that requires coordination with other construction. Examples of activities to combine into separate conferences as follows:
 - 1. Initial Sitework: Clearing and Grading, storm and erosion control measures, building pad preparation, construction entrance to site, storm drainage systems, site utilities, SWPPP (Inspections by Civil Engineer as required by storm water agency).
 - 2. Conference for off-site utility tie-ins with public utility systems companies.
 - 3. Underslab utility rough-ins and slab preparations: Electrical, Plumbing, Fire Sprinkler, soil treatment, concrete slab and steel reinforcements.
 - 4. Building Structures: CMU and brick masonry and accessories, building framing systems, misc. steel framing, water/moisture proofing, hollow metal door frames.
 - 5. Above slab utilities: Electrical, Plumbing, Fire Sprinkler, Mechanical, light gage metal framing, owner's data and communication building systems.
 - 6. Door hardware and accessories, windows.
 - 7. Building final finishes and fixtures: Above ceiling inspections, equipment seismic restraint systems, Gypsum board, ceiling finishes, exterior stucco/EIFS wall finishes, Mechanical equipment and fixtures, mechanical and electrical system start-ups, testing and balancing of mechanical systems, Plumbing fixtures/trim and final testing and inspections, electrical fixtures, building specialties/furnishings and accessories, millwork and trim, floor and wall finishes with building conditioning preparations, appliances, and final inspections and punch lists.
 - 8. Other preinstall conferences as outlined in the specifications.
- C. Attendees: The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. General contractor's project manager and site superintendent shall also attend along with representatives of the Owner and the Architect. If deemed necessary attendance by the design engineers shall also be included. The Subcontractor's Superintendent(s) associated with the activities included in the Pre-Installation Conference will be responsible for conducting the conference in order to demonstrate to the Architect, Engineer(s), and the Owner that ALL parties have a complete and thorough understanding of the associated Contract Requirements.
 - 1. Review the progress of other construction activities and preparations for the particular activity under consideration at each preinstallation conference, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.

- f. Shop Drawings, Product Data, and quality-control samples.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities.
 - q. Space and access limitations.
 - r. Governing regulations.
 - s. Safety.
 - t. Inspecting and testing requirements.
 - u. Required performance results.
 - v. Recording requirements.
 - w. Protection.
2. Record significant discussions and agreements and disagreements of each conference, and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.
 3. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.5 PROGRESS MEETINGS

- A. Conduct progress meetings at the Project Site at regular intervals. Notify the Owner and the Architect of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
- B. Attendees: In addition to representatives of the Owner and the Architect, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
 1. Contractor's Construction Schedule: Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time. A large print copy of the current construction schedule shall be displayed at the project site for review and reference by all meeting attendees.
 2. Review the present and future needs of each entity present, including the following:
 - a. Interface requirements.
 - b. Time.
 - c. Sequences.
 - d. Status of submittals.

- e. Deliveries.
 - f. Off-site fabrication problems.
 - g. Access.
 - h. Site utilization.
 - i. Temporary facilities and services.
 - j. Hours of work.
 - k. Hazards and risks.
 - l. Housekeeping.
 - m. Quality and work standards.
 - n. Change Orders.
 - o. Requests for Information and proposals
 - p. Documentation of information for payment requests.
- D. Reporting: Contractor shall record Minutes of Meeting. No later than 3 days after each meeting, distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
1. Schedule Updating: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

1.6 COORDINATION MEETINGS

- A. Conduct project coordination meetings at regular intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special preinstallation meetings.
- B. Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
- C. Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01200

SECTION 01300 – SUBMITTALS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:

1. Contractor's construction schedule.
2. Submittal schedule.
3. Daily construction reports.
4. Shop Drawings.
5. Product Data.
6. Samples.
7. Quality assurance submittals.

- B. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:

1. Permits.
2. Applications for Payment.
3. Performance and payment bonds.
4. Insurance certificates.
5. List of subcontractors.

- C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Applications for Payment" specifies requirements for submittal of the Schedule of Values.
2. Division 1 Section "Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
3. Division 1 Section "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
4. Division 1 Section "Quality Control & Special Inspections" specifies requirements for submittal of inspection and test reports.
5. Division 1 Section "Contract Closeout" specifies requirements for submittal of Project Record Documents and warranties at project closeout.

1.3 DEFINITIONS

- A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.

1. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.

- B. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.

1.4 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - a. Allow 2 weeks for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
 - b. If an intermediate submittal is necessary, process the same as the initial submittal.
 - c. Allow 2 weeks for reprocessing each submittal.
 - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. Provide a space approximately 4 by 5 inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 2. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Name and address of the Architect.
 - d. Name and address of the Contractor.
 - e. Name and address of the subcontractor.
 - f. Name and address of the supplier.
 - g. Name of the manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. The Architect will not accept submittals received from sources other than the Contractor.
1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 30 days after the date established for "Commencement of the Work."
1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values."
 2. Within each time bar, indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
 3. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
 4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.
 5. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other schedules.
 6. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.
- B. Work Stages: Indicate important stages of construction for each major portion of the Work, including submittal review, testing, and installation.
- C. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- D. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.6 SUBMITTAL SCHEDULE

- A. After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for submittal of the Contractor's Construction Schedule.
1. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractor's Construction Schedule.
 2. Prepare the schedule in chronological order. Provide the following information:
 - a. Scheduled date for the first submittal.
 - b. Related Section number.
 - c. Submittal category (Shop Drawings, Product Data, or Samples).
 - d. Name of the subcontractor.
 - e. Description of the part of the Work covered.
 - f. Scheduled date for resubmittal.
 - g. Scheduled date for the Architect's final release or approval.

- B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
 - 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.7 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Architect at weekly intervals:
 - 1. List of subcontractors at the site.
 - 2. Approximate count of personnel at the site.
 - 3. High and low temperatures, general weather conditions.
 - 4. Accidents and unusual events.
 - 5. Meetings and significant decisions.
 - 6. Stoppages, delays, shortages, and losses.
 - 7. Meter readings and similar recordings.
 - 8. Emergency procedures.
 - 9. Orders and requests of governing authorities.
 - 10. Change Orders received, implemented.
 - 11. Services connected, disconnected.
 - 12. Equipment or system tests and startups.
 - 13. Partial Completions, occupancies.
 - 14. Substantial Completions authorized.

1.8 SHOP DRAWINGS

- A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- B. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
 - 1. Dimensions.
 - 2. Identification of products and materials included by sheet and detail number.
 - 3. Compliance with specified standards.
 - 4. Notation of coordination requirements.
 - 5. Notation of dimensions established by field measurement.
 - 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 36 by 48 inches (890 by 1220 mm).
 - 7. Submittal: Submit 6 blue- or black-line prints and 2 additional prints where required for maintenance manuals. The Architect will retain 2 prints and return the remainder.
 - a. One of the prints returned shall be marked up and maintained as a "Record Document."
 - 8. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

1.9 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 3. Submittals: Submit 6 copies of each required submittal. The Architect will retain one and will return the other marked with action taken and corrections or modifications required.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 4. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
 - a. Do not proceed with installation until a copy of Product Data is in the Installer's possession.
 - b. Do not permit use of unmarked copies of Product Data in connection with construction.

1.10 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
1. Mount or display Samples in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:
 - a. Specification Section number and reference.
 - b. Generic description of the Sample.
 - c. Sample source.
 - d. Product name or name of the manufacturer.
 - e. Compliance with recognized standards.
 - f. Availability and delivery time.
 2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

- a. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.
 - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 - c. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
3. Preliminary Submittals: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices.
- a. The Architect will review and return preliminary submittals with the Architect's notation, indicating selection and other action.
4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 3 sets. The Architect will return one set marked with the action taken.
5. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
- a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
1. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.
 - a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.11 QUALITY ASSURANCE SUBMITTALS

- A. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
- B. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
 1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
- C. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control & Special Inspections".

1.12 ASBESTOS REMOVAL AND DEMOLITION

- A. Refer to Specification Section 01732, Submittals for DHEC requirements prior to any demolition or removal of asbestos.

1.13 ARCHITECT'S ACTION

- A. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
 - 1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
 - 1. Final Unrestricted Release: When the Architect marks a submittal "Reviewed," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When the Architect marks a submittal "Approved as Noted," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
 - 3. Returned for Resubmittal: When the Architect marks a submittal "Not Approved, Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 - a. Do not use, or allow others to use, submittals marked "Not Approved, Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
- C. Unsolicited Submittals: The Architect will return unsolicited submittals to the sender without action.
- D. Review of submittal and subsequent marking of a submittal as "Reviewed", "Furnish as Corrected" or "Revise and Resubmit" by the Architect or Consulting Engineers does not relieve the Contractor of responsibility or liability for the product, material or system not complying with the Contract Documents.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01300

SECTION 01311 – SCHEDULES AND REPORTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for schedules and reports required for proper performance of the Work, including:

1. Contractor's construction schedule.
2. Submittal schedule.
3. Daily construction reports.
4. Field correction reports.

- B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Applications for Payment" specifies requirements for submittal of the Schedule of Values.
2. Division 1 Section "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
3. Division 1 Section "Quality Control and Special Inspections" specifies requirements for submittal of inspection and test reports.
4. Division 1 Section "Materials and Equipment" specifies requirements for submittal of the list of products.

1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of schedules and reports with performance of other construction activities.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Prepare a comprehensive, fully developed, horizontal bar-chart-type, contractor's construction schedule.

1. Submit the schedule within 60 days of the date established for commencement of the Work.
2. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week.
 - a. If practical, use the same breakdown of units of the Work as indicated in the Schedule of Values.
3. Within each time bar, indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion percentage.
4. For significant construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within the time bar. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion percentage.

5. Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
 6. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on schedule with other construction activities. Include minor elements involved in the overall sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.
 7. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other required schedules and reports.
 8. Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's administrative procedures necessary for certification of Substantial Completion.
- B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.5 SUBMITTAL SCHEDULE

- A. After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals cross referenced and coordinated with dates of the work indicated on the construction schedules as required to start and complete the work indicated. Submit the schedule within 10 days of the date required for submittal of the Contractor's Construction Schedule.
1. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values and the list of products as well as the Contractor's Construction Schedule.
- B. Prepare the schedule in chronological order. Provide the following information:
1. Scheduled date for the first submittal.
 2. Related Section number.
 3. Submittal category.
 4. Name of the subcontractor.
 5. Description of the part of the Work covered.
 6. Scheduled date for resubmittal.
 7. Scheduled date for the Architect's final release or approval.
- C. Distribution: Following the Architect's response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated.
1. Post copies in the Project meeting room and temporary field office.
 2. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned part of the Work and are no longer involved in construction activities.

- D. Schedule Updating: Revise the schedule after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.6 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at the site. Retain report at site through Substantial Completion:

1. List of subcontractors at the site.
2. List of separate contractors at the site.
3. Approximate count of personnel at the site.
4. High and low temperatures, general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Meter readings and similar recordings.
10. Emergency procedures.
11. Orders and requests of governing authorities.
12. Change Orders received, implemented.
13. Services connected, disconnected.
14. Equipment or system tests and startups.
15. Partial Completions, occupancies.
16. Substantial Completions authorized.

- B. Field Correction Reports: When the need to take corrective action that requires a departure from the Contract Documents arises, prepare a detailed report. Include a statement describing the problem and recommended changes. Indicate reasons the Contract Documents cannot be followed. Submit a copy to the Architect immediately.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01311

SECTION 01340 – SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submittal of Shop Drawings, Product Data, Samples, and other miscellaneous quality-control submittals.
- B. Shop Drawings include, but are not limited to, the following:
 - 1. Fabrication drawings.
 - 2. Installation drawings.
 - 3. Setting diagrams.
 - 4. Shopwork manufacturing instructions.
 - 5. Templates and patterns.
 - 6. Schedules.
 - a. Standard information prepared without specific reference to the Project is not Shop Drawings.
- C. Product Data include, but are not limited to, the following:
 - 1. Manufacturer's product specifications.
 - 2. Manufacturer's installation instructions.
 - 3. Standard color charts.
 - 4. Catalog cuts.
 - 5. Roughing-in diagrams and templates.
 - 6. Standard wiring diagrams.
 - 7. Printed performance curves.
 - 8. Operational range diagrams.
 - 9. Mill reports.
 - 10. Standard product operating and maintenance manuals.
- D. Samples include, but are not limited to, the following:
 - 1. Partial Sections of manufactured or fabricated components.
 - 2. Small cuts or containers of materials.
 - 3. Complete units of repetitively used materials.
 - 4. Swatches showing color, texture, and pattern.
 - 5. Color range sets.
 - 6. Components used for independent inspection and testing.
 - 7. Field samples.
- E. Quality-control submittals include, but are not limited to, the following:
 - 1. Design data.
 - 2. Certifications.
 - 3. Manufacturer's instructions.

4. Manufacturer's field reports.
- F. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
1. Permits.
 2. Applications for payment.
 3. Performance and payment bonds.
 4. Insurance certificates.
 5. Listing of subcontractors.
- G. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 1 Section "Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
 2. Division 1 Section "Schedules and Reports" specifies requirements for submittal of required schedules and reports, including the Submittal Schedule.
 3. Division 1 Section "Quality Control and Special Inspections" specifies requirements for submittal of inspection and test reports and the erection of mockups.
 4. Division 1 Section "Contract Closeout" specifies requirements for submittal of Project Record Documents, including copies of final Shop Drawings, at project closeout.

1.3 DEFINITIONS

- A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
1. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
- B. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.

1.4 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal to the Architect sufficiently in advance of scheduled performance of related construction activities to avoid delay.
1. Coordinate each submittal with other submittals and related activities that require sequential activity including:
 - a. Testing.
 - b. Purchasing.
 - c. Fabrication.
 - d. Delivery.
 2. Coordinate transmittal of different types of submittals for the same element of the Work and different elements of related parts of the Work to avoid delay in processing because of the Architect's need to review submittals concurrently for coordination.

- a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are forthcoming.
 3. Scheduling: Division 1 Section "Schedules and Reports" includes the Submittal Schedule listing submittals and indicating time requirements for coordination of submittal activity with related construction operations.
 4. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - a. Allow 2 weeks for the Architect's initial review of each submittal. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals. The Architect will advise the Contractor when a submittal being processed must be delayed for coordination.
 - b. Where necessary to provide an intermediate submittal, process the intermediate submittal in the same manner as the initial submittal.
 - c. Allow 2 weeks for reprocessing each submittal.
 - d. The Architect will not authorize an extension of time because of the Contractor's failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification.
1. Indicate name of the firm or entity that prepared each submittal on the label or title block.
 2. Provide a space approximately 4 by 5 inches (100 by 125 mm) on the label or beside the title block to record the Contractor's review and approval markings and the action taken by the Architect.
 3. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Name and address of the Architect.
 - d. Name and address of the Contractor.
 - e. Name and address of the subcontractor.
 - f. Name and address of the supplier.
 - g. Name of the manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
 - j. Similar definitive information as necessary.
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect and to other destinations by use of a transmittal form. The Architect will return submittals received from sources other than the Contractor.
1. Record relevant information and requests for data on the transmittal form. On the form, or an attached separate sheet, record deviations from requirements of the Contract Documents, including minor variations and limitations.
 2. Include the Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 3. Transmittal Form: Prepare a draft of a transmittal form and submit it to the Architect for acceptance. Provide places on the form for the following information:
 - a. Project name.
 - b. Date.
 - c. Destination (To:).

- d. Source (From:).
- e. Names of the subcontractor, manufacturer, and supplier.
- f. Category and type of submittal.
- g. Submittal purpose and description.
- h. Submittal and transmittal distribution record.
- i. Remarks.
- j. Signature of transmitter.

1.5 SHOP DRAWINGS

- A. Submit newly prepared information, drawn accurately to scale. Do not reproduce Contract Documents or copy standard printed information as the basis of Shop Drawings.
 1. Include the following information on Shop Drawings:
 - a. Dimensions.
 - b. Identification of products and materials included.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 2. Submit Coordination Drawings where required for integration of different construction elements. Show construction sequences and relationships of separate components where necessary to avoid conflicts in utilization of the space available.
 3. Highlight, encircle, or otherwise indicate deviations from the Contract Documents on the Shop Drawings.
 4. Do not allow Shop Drawing copies that do not contain an appropriate final stamp or other marking indicating the action taken by the Architect to be used in construction.
 5. Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 30 by 40 inches (750 by 1000 mm).
 6. Submittal: Submit 6 blue- or black-line prints, unless prints are required for maintenance manuals. The Architect will retain 2 prints. The remainder will be returned.
 - a. The Contractor shall mark up and retain one of the prints returned as a "Record Document."

1.6 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Mark each copy to show which choices and options are applicable to the Project.
 1. Where Product Data includes information on several similar products, some of which are not required for use on the Project, mark copies clearly to indicate which products are applicable.
 2. Where Product Data must be specially prepared for required products, materials, or systems because standard printed data are not suitable for use, submit as Shop Drawings not Product Data.
 3. Include the following information in Product Data:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with recognized trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.

4. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
- B. Submittals: Submit 6 copies of each required Product Data submittal. The Architect will retain one copy and will return the other marked with the action taken and corrections or modifications required.
1. Unless the Architect observes noncompliance with provisions of the Contract Documents, the submittal may serve as the final submittal.
- C. Distribution: Furnish copies of final Product Data submittal to the manufacturers, subcontractors, suppliers, fabricators, installers, governing authorities and others as required for performance of the construction activities. Show distribution on transmittal forms.
1. Do not proceed with installation of materials, products, and systems until a copy of Product Data applicable to the installation is in the Installer's possession.
 2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.7 SAMPLES

- A. Submit full-size, fully fabricated Samples, cured and finished in the manner specified, and physically identical with the material or product proposed for use.
1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample where so indicated. Include the following information:
 - a. Generic description of the Sample.
 - b. Size limitations.
 - c. Sample source.
 - d. Product name or name of manufacturer.
 - e. Compliance with recognized standards.
 - f. Compliance with governing regulations.
 - g. Availability.
 - h. Delivery time.
 2. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented by a Sample, submit at least 3 multiple units that show approximate limits of the variations.
 - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 - c. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
- B. Submittals: Except for Samples intended to illustrate assembly details, workmanship, fabrication techniques, connections, operation, and other characteristics, submit 3 sets of Samples. One set will be returned marked with the action taken.

1. Maintain sets of Samples, as returned by the Architect, at the Project Site, available for quality-control comparisons throughout the course of construction activity.
 2. Unless the Architect observes noncompliance with provisions of the Contract Documents, the submittal may serve as the final submittal.
 3. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- C. Distribution of Samples: Distribute additional sets of Samples to the subcontractors, suppliers, fabricators, manufacturers, installers, governing authorities, and others as required for performance of the Work. Show distribution on transmittal forms.
- D. Field samples specified in individual Specification Sections are special types of Samples. Comply with Sample submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.8 QUALITY ASSURANCE SUBMITTALS

- A. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
- B. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
1. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
- C. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control and Special Inspections."

1.9 CONTRACTOR'S ACTION

- A. The General Contractor is required to provide qualified personnel who must review, comment, mark corrections, etc., of all shop drawings, manufacturer's data, samples, etc., prior to submission to the Architect for review.
- B. It is the General Contractor's responsibility to review and confirm all submittals and the products, materials, equipment, etc., contained therein are in conformance with the Contract Documents.
- C. Any and all nonconforming submittals shall be rejected by the General Contractor and returned to the parties submitting review documentation.
- D. Neither the Architect or Owner will be held liable for delays due to nonconforming submittals by the General Contractor or any of their subcontractors, suppliers, vendors, etc.

1.10 ARCHITECT'S ACTION

- A. Except for submittals for the record or for information, where action and return of submittals is required, the Architect will review each submittal, mark to indicate the action taken, and return.
1. Compliance with specified characteristics is the Contractor's responsibility and not considered part of the Architect's review and indication of action taken.

- B. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
1. Final Unrestricted Release: Where submittals are marked "Approved," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final acceptance will depend on that compliance.
 2. Final-but-Restricted Release: When submittals are marked "Approved as Noted," the Work covered by the submittal may proceed provided it complies with both the Architect's notations or corrections on the submittal and requirements of the Contract Documents. Final acceptance will depend on that compliance.
 3. Returned for Resubmittal: When submittal is marked "Not Approved, Revise and Resubmit," do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the Architect's notations. Resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Not Approved, Revise and Resubmit" to be used at the Project Site or elsewhere where construction is in progress.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01340

SECTION 01421 – REFERENCE STANDARDS AND DEFINITIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the Conditions of the Contract.
- B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
- D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 2. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
 - J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
 - K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.
- 1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION
- A. Specification Format: These Specifications are organized into Divisions and Sections based on the 16-division format and CSI/CSC's "MasterFormat" numbering system.
 - B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Section Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- 1.4 INDUSTRY STANDARDS
- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
 - B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.

- C. **Conflicting Requirements:** Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the Architect for a decision before proceeding.
1. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.
- D. **Copies of Standards:** Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
- E. **Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01421

SECTION 01500 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.
- B. Note: Contractor's set-up of the job site construction trailer on the project site along with temporary power and operational telephone/fax service and equipment shall be required prior to the first "pre-installation" conference. Request for extension of time due to the contract's inability to setup temporary facilities as previously stated will not be granted unless otherwise approved by the Owner and Architect.
- C. Temporary utilities include, but are not limited to, the following:
 - 1. Telephone service.
- D. Support facilities include, but are not limited to, the following:
 - 1. Construction aids and miscellaneous services and facilities.
- E. Security and protection facilities include, but are not limited to, the following:
 - 1. Temporary fire protection where required by code.
 - 2. Barricades, warning signs, and lights.
 - 3. Sidewalk bridge or enclosure fence for the site when required.
 - 4. Environmental protection.

1.3 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department, and rescue squad rules.
 - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition".

1.5 PROJECT CONDITIONS

- A. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work

progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. If acceptable to the Architect, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

2.2 BARRIERS

- A. Provide suitable barriers and such warning lights as will effectively prevent the occurrence of any accident to health, limb, or property.
- B. Lights shall be maintained between the hours of sunset and sunrise.
- C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

2.3 PROTECTION OF INSTALLED WORK

- A. Protect installed work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.

2.4 EQUIPMENT

- A. General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4-inch (19-mm), heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet (30 m) long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
- C. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- D. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- E. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- F. Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-

rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. Water Service: Owner Provided.
- B. Electric Power Service: Owner Provided.
- C. Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
- D. On-Site Sanitary facilities may be used.
 1. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.
 1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.
 2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
- B. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
 4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- B. Permanent Fire Protection: At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
- C. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- D. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.

END OF SECTION 01500

SECTION 01600 – MATERIALS AND EQUIPMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
 - 2. Division 1 Section "Submittals" specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.
 - 3. Division 1 Section "Substitutions" specifies administrative procedures for handling requests for substitutions made after award of the Contract.

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
 - 1. "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - a. "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
 - 2. "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
 - 3. "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.4 SUBMITTALS

- A. Product List: Prepare a list showing products specified in tabular form acceptable to the Architect. Include generic names of products required. Include the manufacturer's name and proprietary product names for each item listed.
 - 1. Coordinate product list with the Contractor's Construction Schedule and the Schedule of Submittals.
 - 2. Form: Prepare product list with information on each item tabulated under the following column headings:

- a. Related Specification Section number.
- b. Generic name used in Contract Documents.
- c. Proprietary name, model number, and similar designations.
- d. Manufacturer's name and address.
- e. Supplier's name and address.
- f. Installer's name and address.
- g. Projected delivery date or time span of delivery period.

1.5 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
 1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.
- B. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
 1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
 1. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.

4. Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
5. Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
6. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
7. Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation. Maintain temperature and humidity within range required by manufacturer's instructions.

PART 2 – PRODUCTS

2.1 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
 1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
 1. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.
 2. Semiproprietary Specification Requirements: Where Specifications name 2 or more products or manufacturers, provide 1 of the products indicated. No substitutions will be permitted.
 - a. Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" or "or approved equal," comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 3. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
 4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
 5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
 - a. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.

6. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
7. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.
 - a. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.
8. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
9. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.

PART 3 – EXECUTION

3.1 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01600

SECTION 01631 – SUBSTITUTIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract. Refer to Specification Section 01632 - Request For Pre-Approval for pre-approval procedures prior to receipt of bids.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
 - 2. Division 1 Section "Submittals" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
 - 3. Division 1 Section "Materials and Equipment" specifies requirements governing the Contractor's selection of products and product options.

1.3 DEFINITIONS

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:
 - 1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
 - 2. Revisions to the Contract Documents requested by the Owner or Architect.
 - 3. Specified options of products and construction methods included in the Contract Documents.
 - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution request shall include the following information:
 - 1. Submit one copy of each request for substitution for consideration. Submit requests in the form and according to procedures required for change order proposals.
 - 2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
 - 3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:

- a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed substitution.
 - b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
 - c. Product data, including drawings and descriptions of products and fabrication and installation procedures.
 - d. Samples, where applicable or requested.
 - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall contract time.
 - f. Cost information, including a proposal of the net change, if any in the contract sum.
 - g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation of a request for substitution. The Architect will notify the parties requesting substitution of acceptance or rejection of the substitution after receipt of the request, or after receipt of requested additional information or documentation, whichever is later. Architect will not be responsible for rejection of a substitution request due to negligence of the parties requesting substitution to submit all data required to determine equivalent evaluation of a substitution. Acceptance will be in the form of a change order.
- a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute request.

PART 2 – PRODUCTS

2.1 SUBSTITUTIONS

- A. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.
1. Extensive revisions to the Contract Documents are not required.
 2. Proposed changes are in keeping with the general intent of the Contract Documents.
 3. The request is timely, fully documented, and properly submitted.
 4. The specified product or method of construction cannot be provided within the contract time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the work promptly or coordinate activities properly.
 5. The request is directly related to an "or equivalent" clause or similar language in the Contract Documents.
 6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation

- to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
 9. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.
- C. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within two weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.
1. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01631

SECTION 01632 – REQUEST FOR PRE-APPROVAL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for handling pre-approval requests for substitutions prior to receipt of bids. Refer to Specification Section 01631 - Substitutions for substitution request procedures after award of contract.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 0 Section "Document 00150" specifies the Instructions to Bidders (AIA Document A701) for Substitutions
 2. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
 3. Division 1 Section "Submittals" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
 4. Division 1 Section "Materials and Equipment" specifies requirements governing the Contractor's selection of products and product options.
- C. No substitute to that specified or called for on the drawings will be considered unless request for approval is submitted NOT LESS THAN TEN (10) CALENDAR DAYS PRIOR TO THE BID DATE and approval of same issued to all Bidders of Record by Addendum not later than five (5) calendar days prior to the bid date. Each request shall contain the following:
1. Name of project and location.
 2. Name of material or equipment to be submitted.
 3. Performance and test data.
 4. Any and all other detailed specification information required for an evaluation.
 5. Specified location of item in contract documents.
 6. Complete list designating any changes in related materials, equipment, and/or work that inclusion of substitute would necessitate.
 7. Difference between specified item and item submitted for approval.
 8. Line item by line item comparison of differences between specified item and item submitted for approval.
 9. Samples, when applicable.
- D. NOTE: The burden of proof of the merit of the proposed substitution is upon the parties requesting approval.
- E. The Architect's decision of approval or disapproval of a proposed substitution shall be final.
- #### 1.3 SUBMITTALS
- A. Substitution request prior to receipt of bids submittal: The Architect will consider requests for substitution if received at least ten (10) days prior to bid date. Requests received less than ten (10) days prior to bid date will not be considered.

1. Submit one copy of each request for substitution for consideration.
2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
 - a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed substitution.
 - b. A detailed comparison (item-for-item), of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effects.
 - c. Product data, including drawings and descriptions of products and fabrication and installation procedures.
 - d. Samples, where applicable or requested.
 - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall contract time.
 - f. Cost information, including a proposal of the net change, if any in the contract sum.
 - g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
 - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation of a request for substitution. The Architect will notify the parties requesting substitution of acceptance or rejection of the substitution after receipt of the request, or after receipt of requested additional information or documentation, whichever is later. Architect will not be responsible for rejection of a substitution request due to negligence of the parties requesting substitution to submit all data required to determine equivalent evaluation of a substitution. Acceptance will be included in an addendum prior to receipt of bid proposals.
 - a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute request prior to receipt of bids.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01632

SECTION 01710 – FINAL CLEANING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for final cleaning at Substantial Completion.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls" specifies general cleanup and waste-removal requirements.
 - 2. Division 1 Section "Contract Closeout" specifies general contract closeout requirements.
 - 3. Special cleaning requirements for specific construction elements are included in appropriate Sections of Divisions 2 through 16.
- C. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and antipollution regulations.
 - 1. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
 - 2. Burning or burying of debris, rubbish, or other waste material on the premises is not permitted.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 – EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final-cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to the condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or a portion of the Project.

1. Clean the Project Site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and foreign substances.
 2. Sweep paved areas broom clean. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 3. Remove petrochemical spills, stains, and other foreign deposits.
 4. Remove tools, construction equipment, machinery, and surplus material from the site.
 5. Remove snow and ice to provide safe access to the building.
 6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 7. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 8. Broom clean concrete floors in unoccupied spaces.
 9. Vacuum clean carpet and similar soft surfaces, removing debris and excess nap. Shampoo, if required.
 10. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 11. Remove labels that are not permanent labels.
 12. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 13. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 14. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 15. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 16. Clean ducts, blowers, and coils if units were operated without filters during construction.
 17. Clean food-service equipment to a sanitary condition, ready and acceptable for its intended use.
 18. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs and defective and noisy starters in fluorescent and mercury vapor fixtures.
 19. Leave the Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests. Comply with regulations of local authorities.
- D. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.
- E. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of lawfully.
1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION 01710

SECTION 01720 – PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents.

- B. Project Record Documents required include the following:

1. Marked-up copies of Contract Drawings.
2. Marked-up copies of Shop Drawings.
3. Newly prepared drawings.
4. Marked-up copies of Specifications, addenda, and Change Orders.
5. Marked-up Product Data submittals.
6. Record Samples.
7. Field records for variable and concealed conditions.
8. Record information on Work that is recorded only schematically.

- C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 1 Section "Submittals" specifies general requirements for preparing and submitting Project Record Documents.
2. Division 1 Section "Contract Closeout" specifies general closeout requirements.
3. Divisions 2 through 16 Sections for specifying Project Record Document requirements for specific pieces of equipment or building operating systems.

- D. Maintenance of Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition. Make documents and Samples available at all times for the Architect's inspections.

1.3 RECORD DRAWINGS

- A. Markup Procedure: During construction, maintain a set of blue- or black-line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes.

1. Mark these Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:
 - a. Dimensional changes to the Drawings.
 - b. Revisions to details shown on the Drawings.
 - c. Depths of foundations below the first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.

- f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by change order or Construction Change Directive.
 - k. Changes made following the Architect's written orders.
 - l. Details not on original Contract Drawings.
2. Mark record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
 3. Mark record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 4. Mark important additional information that was either shown schematically or omitted from original Drawings.
 5. Note Construction Change Directive numbers, alternate numbers, change-order numbers, and similar identification.
- B. Responsibility for Markup: The individual or entity who obtained record data, whether the individual or entity is the Installer, subcontractor, or similar entity, shall prepare the markup on record drawings.
1. Accurately record information in an understandable drawing technique.
 2. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.
 3. At time of Substantial Completion, submit record drawings to the Architect for the Owner's records. Organize into sets and bind and label sets for the Owner's continued use.
- C. Preparation of Transparencies: Immediately prior to inspecting Certification of Substantial Completion, review completed marked-up record drawings with the Architect. When authorized, prepare a full set of corrected transparencies of Contract Drawings and Shop Drawings.
1. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each drawing; include the printed designation "PROJECT RECORD DRAWINGS" in a prominent location on each drawing.
 2. Refer instances of uncertainty to the Architect for resolution.
 3. The Contractor is responsible for printing original Contract Drawings and other drawings as required to produce transparencies. The Architect will make original Contract Drawings available to the Contractor's print shop.
- D. Copies and Distribution: After completing the preparation of transparency record drawings, print 2 black-line prints of each drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable-paper cover sheets. Include appropriate identification, including titles, dates, and other information on the cover sheets.
1. Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.
 2. Organize record transparencies into sets matching the print sets. Place these sets in durable tube-type drawing containers with end caps. Mark the end cap of each container with suitable identification.
 3. Submit the marked-up record set and 2 copy sets to the Architect for the Owner's records.

- E. Newly Prepared Record Drawings: Prepare new drawings instead of following procedures specified for preparing record drawings where new drawings are required, and the Architect determines that neither original Contract Drawings nor Shop Drawings are suitable to show the actual installation. New drawings may be required when a change order is issued as a result of accepting an alternate, substitution, or other modification.
 - 1. Consult with the Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. When completed and accepted, integrate newly prepared Drawings with procedures specified for organizing, copying, binding and submitting record drawings.

1.4 RECORD SPECIFICATIONS

- A. During the construction period, maintain 3 copies of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.
 - 1. Mark the Specifications to indicate the actual installation where the installation varies from that indicated in Specifications and modifications issued. Note related project record drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later.
 - 2. Upon completion of markup, submit record Specifications to the Architect for the Owner's records.

1.5 RECORD PRODUCT DATA

- A. During the construction period, maintain one copy of each Product Data submittal for Project Record Document purposes.
 - 1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation.
 - 2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 3. Note related Change Orders and markup of record Drawings, where applicable.
 - 4. Upon completion of markup, submit a complete set of record Product Data to the Architect for the Owner's records.
 - 5. Where record Product Data is required as part of maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as record Product Data.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 RECORDING

- A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project.

END OF SECTION 01720

SECTION 01730 – OPERATION AND MAINTENANCE DATA

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for operation and maintenance manuals, including the following:
 - 1. Preparing and submitting operation and maintenance manuals for building operating systems and equipment.
 - 2. Preparing and submitting instruction manuals covering the care, preservation, and maintenance of architectural products and finishes.
 - 3. Instruction of the Owner's operating personnel in the operation and maintenance of building systems and equipment.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section "Submittals" specifies preparation of Shop Drawings and Product Data.
 - 2. Division 1 Section "Contract Closeout" specifies general closeout requirements.
 - 3. Division 1 Section "Contract Closeout" specifies general requirements for submitting project record documents.
 - 4. Appropriate Sections of Divisions 2 through 16 specify special operation and maintenance data requirements for specific pieces of equipment or building operating systems.

1.3 QUALITY ASSURANCE

- A. Maintenance Manual Preparation: In preparation of maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of equipment or system involved.
 - 1. Where maintenance manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.
 - 2. Where maintenance manuals require drawings or diagrams, use draftsmen capable of preparing drawings clearly in an understandable format.
- B. Instructions for the Owner's Personnel: Use experienced instructors thoroughly trained and experienced in operation and maintenance of equipment or system involved to instruct the Owner's operation and maintenance personnel.

1.4 SUBMITTALS

- A. Form of Submittal: Prepare operation and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel. Organize into three (3) suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.
 - 1. Binders: For each manual, provide heavy-duty, commercial-quality, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-

1/2-by-11- inch (115-by-280-mm) paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.

- a. Where 2 or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.
 - b. Identify each binder on front and spine, with the printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.
2. Dividers: Provide heavy paper dividers with celluloid-covered tabs for each separate Section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the Section on each divider.
 3. Protective Plastic Jackets: Provide protective, transparent, plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
 4. Text Material: Where maintenance manuals require written material, use the manufacturer's standard printed material. If manufacturer's standard printed material is not available, provide specially prepared data, neatly typewritten, on 8-1/2-by-11-inch (115-by-280-mm), 20-lb/sq. ft. (75-g/sq. m) white bond paper.
 5. Drawings: Where maintenance manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.
 - a. Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.
 - b. If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents, and drawing location at the appropriate location in the manual.

1.5 MANUAL CONTENT

- A. In each manual include information specified in the individual Specification Section and the following information for each major component of building equipment and its controls:
 1. General system or equipment description.
 2. Design factors and assumptions.
 3. Copies of applicable Shop Drawings and Product Data.
 4. System or equipment identification, including:
 - a. Name of manufacturer.
 - b. Model number.
 - c. Serial number of each component.
 5. Operating instructions.
 6. Emergency instructions.
 7. Wiring diagrams.
 8. Inspection and test procedures.
 9. Maintenance procedures and schedules.
 10. Precautions against improper use and maintenance.
 11. Copies of warranties.
 12. Repair instructions including spare parts listing.
 13. Sources of required maintenance materials and related services.
 14. Manual index.

- B. Organize each manual into separate Sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of Product Data, supplemented by Drawings and written text; and copies of each warranty, bond, and service contract issued.
1. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:
 - a. Subject matter covered by the manual.
 - b. Name and address of the Project.
 - c. Date of submittal.
 - d. Name, address, and telephone number of the Contractor.
 - e. Name and address of the Architect.
 - f. Cross-reference to related systems in other operation and maintenance manuals.
 2. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.
 - a. Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.
 3. General Information: Provide a general information Section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or Installer and the maintenance contractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.
 4. Product Data: Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one item in a tabular format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
 5. Written Text: Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.
 6. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to assure correct illustration of the completed installation.
 - a. Do not use original project record documents as part of operation and maintenance manuals.
 7. Warranties, Bonds, and Service Contracts: Provide a copy of each warranty, bond, or service contract in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect validity of warranty or bond.

1.6 MATERIAL AND FINISHES MAINTENANCE MANUAL

- A. Submit 3 copies of each manual, in final form, on material and finishes to the Architect for distribution. Provide one section for architectural products, including applied materials and finishes. Provide a second section for products designed for moisture protection and products exposed to the weather.
1. Refer to individual Specification Sections for additional requirements on care and maintenance of materials and finishes.
- B. Architectural Products: Provide manufacturer's data and instructions on care and maintenance of architectural products, including applied materials and finishes.
1. Manufacturer's Data: Provide complete information on architectural products, including the following, as applicable:
 - a. Manufacturer's catalog number.
 - b. Size.
 - c. Material composition.
 - d. Color.
 - e. Texture.
 - f. Reordering information for specially manufactured products.
 2. Care and Maintenance Instructions: Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information on cleaning agents and methods that could prove detrimental to the product. Include manufacturer's recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Products Exposed to the Weather: Provide complete manufacturer's data with instructions on inspection, maintenance, and repair of products exposed to the weather or designed for moisture-protection purposes.
1. Manufacturer's Data: Provide manufacturer's data giving detailed information, including the following, as applicable:
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Installation details.
 - d. Inspection procedures.
 - e. Maintenance information.
 - f. Repair procedures.

1.7 EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL

- A. Submit 3 copies of each manual, in final form, on equipment and systems to the Architect for distribution. Provide separate manuals for each unit of equipment, each operating system, and each electric and electronic system.
1. Refer to individual Specification Sections for additional requirements on operation and maintenance of the various pieces of equipment and operating systems.

- B. Equipment and Systems: Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.
1. Description: Provide a complete description of each unit and related component parts, including the following:
 - a. Equipment or system function.
 - b. Operating characteristics.
 - c. Limiting conditions.
 - d. Performance curves.
 - e. Engineering data and tests.
 - f. Complete nomenclature and number of replacement parts.
 2. Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following:
 - a. Printed operation and maintenance instructions.
 - b. Assembly drawings and diagrams required for maintenance.
 - c. List of items recommended to be stocked as spare parts.
 3. Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following:
 - a. Routine operations.
 - b. Troubleshooting guide.
 - c. Disassembly, repair, and reassembly.
 - d. Alignment, adjusting, and checking.
 4. Operating Procedures: Provide information on equipment and system operating procedures, including the following:
 - a. Startup procedures.
 - b. Equipment or system break-in.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Instructions on stopping.
 - f. Shutdown and emergency instructions.
 - g. Summer and winter operating instructions.
 - h. Required sequences for electric or electronic systems.
 - i. Special operating instructions.
 5. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.
 6. Controls: Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.
 7. Coordination Drawings: Provide each Contractor's Coordination Drawings.
 - a. Provide as-installed, color-coded, piping diagrams, where required for identification.
 8. Valve Tags: Provide charts of valve-tag numbers, with the location and function of each valve.
 9. Circuit Directories: For electric and electronic systems, provide complete circuit directories of panelboards, including the following:
 - a. Electric service.

- b. Controls.
- c. Communication.

1.8 INSTRUCTIONS FOR THE OWNER'S PERSONNEL

- A. Prior to final inspection, instruct the Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Provide instruction at mutually agreed upon times.
 - 1. For equipment that requires seasonal operation, provide similar instruction during other seasons.
 - 2. Use operation and maintenance manuals for each piece of equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01730

SECTION 01740 – WARRANTIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.

- 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

- B. Related Sections: The following Sections contain requirements that relate to this Section:

- 1. Division 1 Section "Submittals" specifies procedures for submitting warranties.
 - 2. Division 1 Section "Contract Closeout" specifies contract closeout procedures.
 - 3. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

- C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.5 SUBMITTALS

A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within 15 days of completion of that designated portion of the Work.

B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.

C. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.

1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.

2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.

3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01740

SECTION 01750 – CONTRACT CLOSEOUT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project record document submittal.
 - 3. Operation and maintenance manual submittal.
 - 4. Submittal of warranties.
 - 5. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.
- C. Note, each project of a multi-project contract shall require separate close out packages (ex. Record drawings, warranties, binders, etc...)

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
 - a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Advise the Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Submit record drawings (as-built), maintenance manuals, final project photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra stock, and similar items.
 - 7. Make final changeover of permanent locks and transmit keys directly to the Owner. (Recommended to request signed release form for all like items to be directly turned over to owner.) Advise the Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems and instruction of the Owner's operation and maintenance personnel.
 - 9. Complete final cleanup requirements, including touchup painting.

10. Touch up and otherwise repair and restore marred, exposed finishes.
 11. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
- B. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
1. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
 2. Results of the completed inspection will form the basis of requirements for final acceptance.
- 1.4 FINAL ACCEPTANCE
- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
 4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
 5. Submit consent of surety to final payment.
 6. Submit a final liquidated damages settlement statement.
 7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.
1. Upon completion of reinspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, reinspection will be repeated.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

END OF SECTION 01750

CONTRACT CLOSEOUT

SECTION 06105 – MISCELLANEOUS CARPENTRY

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Framing with dimension lumber.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 6 Section 06200 "Finish Carpentry" for interior woodwork not specified in this Section.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:
 - 1. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
 - 2. For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.
- D. Warranty of chemical treatment manufacturer for each type of treatment.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.
 - 1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

PART 2 – PRODUCTS

2.1 LUMBER, GENERAL

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard", and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
1. NELMA - Northeastern Lumber Manufacturers Association.
 2. NLGA - National Lumber Grades Authority (Canadian).
 3. RIS - Redwood Inspection Service.
 4. SPIB - Southern Pine Inspection Bureau.
 5. WCLIB - West Coast Lumber Inspection Bureau.
 6. WWPA - Western Wood Products Association.
- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece.
- D. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
1. Provide dressed lumber, S4S, unless otherwise indicated.
 2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection agency approved by ALSC's Board of Review.
- B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. (4.0 kg/cu. m). After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:
1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood framing members less than 18 inches (460 mm) above grade.
 4. Wood floor plates installed over concrete slabs directly in contact with earth.
- C. Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to a minimum retention of 0.40 lb/cu. ft. (6.4 kg/cu. m).
1. Approved Uses, Applications and Wood Species
 - a. Interior, Above Ground, Weather Protected, Covered Structure, Air or Kiln Dried Wood Components:
 1. Framing • Studs • Roof & Floor Trusses • Rafters, Beams, Joist & Headers • Engineered Wood • OSB • Plywood • Roof, Wall & Floor Sheathing • Molding & Trim • Millwork.

- b. Approved for application to wood components that have been treated with any of the following:
 - 1. CCA • ACZA • CA • CAB • ACQ • Borates.
- c. Air or Kiln Dried Wood Species:
 - 1. Douglas Fir • Hem-Fir • Southern Yellow Pine • Spruce-Pine-Fir • White Wood.
 - 2. Most Soft & Hardwood Species.

2.3 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.
- B. Miscellaneous Framing: Provide the following grades and species:
 - 1. Grade: No. 2.
 - 2. Species: Spruce-pine-fir south; NELMA.
 - 3. Species: Southern pine; SPIB.
- C. Concealed Boards: Where boards will be concealed by other work, provide lumber with 19 percent maximum moisture content and of following species and grade:

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material and finish required for application indicated to provide secure attachment, concealed where possible.
 - 1. Where finish carpentry materials are exposed in areas of high humidity, provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A 153.
- B. Aliphatic- or phenolic-resin wood glue recommended by manufacturer for general carpentry use.

2.5 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where miscellaneous carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.
- B. Nails, Wire, Brads, and Staples: FS FF-N-105.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
- C. Fit carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.
- E. Securely attach carpentry work as indicated and according to applicable codes and recognized standards.
- F. Countersink nail heads on exposed carpentry work and fill holes with wood filler.
- G. Use fasteners of appropriate type and length. Pre-drill members when necessary to avoid splitting wood.

END OF SECTION 06105

SECTION 06160 – SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall sheathing.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 WALL SHEATHING

- A. Plywood Wall Sheathing: 5/8" nominal (19/32) common CDX sheathing.

2.3 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

1. Adhesives shall have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."

END OF SECTION 06160

SECTION 07210 – BUILDING INSULATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Concealed Building Insulation.
 - 2. Safing Insulation.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 07510 "Metal Building Roof Insulation".

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of insulation product specified.
- C. Product test reports from and based on tests performed by a qualified independent testing agency evidencing compliance of insulation products with specified requirements including those for thermal resistance, fire-test-response characteristics, water-vapor transmission, water absorption, and other properties, based on comprehensive testing of current products.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated on Drawings or specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:
1. Glass-Fiber Blanket Insulation:
 - a. CertainTeed Corporation.
 - b. Guardian Fiberglass, Inc.
 - c. Johns Manville.
 - d. Knauf Fiber Glass.
 - e. Owens Corning.

2.2 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
- B. Faced Mineral-Fiber Blanket Insulation: Thermal insulation combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 (flame spread of 25 or less)
1. Mineral-Fiber Type: Fibers manufactured from glass, slag wool, or rock wool.
 2. Flanged Units: Provide blankets fabricated with facing incorporating 5-inch wide flanges along edges for attachment to framing members.
 3. Provide building insulation as follows:
 - a. Interior Walls: R-13 insulation (total system including vinyl backed building insulation).
- Note: These "R" values shall take precedence over insulation values as noted throughout other specification sections and details of the Contract Documents.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or that interfere with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

- B. Install insulation that is undamaged, dry, unsoiled, and has not been exposed at any time to ice and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Apply single layer of insulation to produce thickness indicated.

3.4 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
- C. Set reflective, foil-faced units with not less than 0.75-inch air space in front of foil as indicated.
- D. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
 - 1. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
- E. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

3.5 PROTECTION

- A. General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07210

SECTION 07211 – INTERIOR ROOF LINER SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior liner system fabric of the color specified, support strapping of the appropriate color, fasteners of the appropriate type and color, sealants, thermal break materials and formaldehyde free thermal insulation of the appropriate type to insulate the roof and wall areas to the full designed R-value of the building as specified.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Submit the following submittals:
 - 1. Manufacturer's product brochures.
 - 2. component specifications, samples of the painted support strapping, and samples of the Syseal[®] reinforced polyethylene vapor retarder fabric.
 - 3. A sample of the triple extrusion welded seam.
 - 4. Specific detailed drawings from Thermal Design for the project showing purlin spacings, support strap locations and spacings, fastening points, liner system fabric sizes and locations; insulation widths and thicknesses, sizes and locations.
 - 5. Detailed installation instructions for quality assurance and OSHA compliance.

1.4 QUALITY ASSURANCE

- A. Provide the materials in original manufacturer's packages together with detailed instructions and project drawings of the installation. Materials shall be inspected for damage, proper sizes and quantities upon delivery and stored in a dry, secure manner.
- B. Post the detailed training instructions, project specific safety drawings, and plans for OSHA compliance using the product.
- C. Installation shall proceed with care to assure proper sealing of the liner system fabric.
- D. Insulation shall be placed on (roof) or behind (walls) the liner system fabric in the full-specified thickness without voids. Notify Thermal Design (800.255.0776) immediately of any damages, improper sizes or shortages.
- E. No changes or substitutions will be allowed unless submitted at least 10 days prior to bid date and in compliance with Simple Saver System standards as set forth in this specification.
- F. Substitutions of systems that do not have a continuous vapor retarder on the inside plane of the purlins or girts will not be allowed.

- G. Purlins, girts and insulation must be completely isolated from the inside conditioned air with an effective vapor retarder.
- H. Taping or stapling of vapor retarder lap joints is not acceptable. Sealing field joints with a permanent vapor retarder lap sealant is required. Field seams, if any, shall be made on a structural member and mechanically attached with a steel strap and fasteners along its full length.
- I. All exposed parts of the liner system shall be Class A material and have flame spread of 25 or less based on ASTM E84 standards.
- J. Vapor retarder fabric shall be white or colored woven coated fabric and triple extrusion-welded seams fabricated in one piece, to fit not less than the full bay length by the width of the building. Buildings more than 100' wide may have field seams on the bottom of a purlin but no less than 50' apart.
- K. Any field seams must be sealed with vapor retarder lap sealant. Wall bay minimum fabric size shall be not less than one entire wall bay or end wall column space from the ceiling to the floor. Perimeter edges of the vapor retarder fabric shall be trimmed and sealed to the adjoining steel or fabric with vapor retarder lap sealant. All edges of liner system fabric, including field seams, shall be mechanically fastened with steel retaining straps the full perimeter.
- L. In the event that the crew is not experienced in the installation procedures, video taped or on-site installation training shall be requested by the installing contractor from Thermal Design to assure proper installation procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

1.6 WARRANTY

- A. Provide Simple Saver System Ten (10) year limited materials warranty.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:

- 1. Simple Saver Insulation System (with free OSHA compliant through fall protection):

- a. Thermal Design
601 North Main Street
PO Box 465
Madison, NE 68748
(800) 255-0776
www.thermaldesign.com

2.2 ROOF LINER SYSTEM

- A. General: Provide materials that comply with requirements and with referenced standards.

B. Roof insulation to be an R-value of 30 and an average installed thickness of 8 inches.

C. Roof system shall be a multi-layer system.

2.3 STEEL STRAP

A. 100 KSI minimum yield high tensile strength steel, galvanized, primed and then painted the specified color on the exposed side with a clear coat primer on the unexposed side.

B. Minimum size shall be 0.02" x 1" x continuous length.

C. The strap color shall be UVMAX 8 White.

D. Traverse strap pattern shall include one strap six (6) inches away from each rafter flange with the remaining space between rafters divided into equal spaces not to exceed five (5) feet. Longitudinal straps shall be nominally thirty (30) inches on-center, with two adjacent straps at the ridge line.

2.4 FASTENERS

A. Fasteners to be #12 x 3/4", plated self-drilling screws with sealing washers painted to match the specified color for fastening to light gauge steel (up to 12 GA purlins).

B. Special fasteners for wood, concrete and other structure types are available from Thermal Design and should be used when appropriate.

2.5 FABRIC

A. Fabric shall be woven reinforced high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene film.

B. The fabric grade for the roof shall be Syseal FP (White).

C. The fabric shall comply with UL/ULC 723 or ASTM E84, and be Class A compliant with a low flame spread index of 25 or less based on ASTM E84 test standards.

D. This material shall be manufactured in large custom pieces by extrusion welding from roll goods. Pieces shall be fabricated to substantially fit the large defined building areas with minimum practical sealing to be done on job site. Fabric shall be folded to allow for rapid pull-out on the strap support system. The fabric shall be certified for free fall protection by the manufacturer. Custom colors available by special order.

E. Syseal liner system fabric perm rating shall not function as a vapor retarder but shall be perforated with 3/16" minimum holes space not more than four (4) inches apart in each direction.

2.6 SEALANTS

A. Sealants shall be Simple Saver System G524 High Tack Sealant™ for sealing vapor retarder laps and/or Simple Saver System G220 Pressure Sensitive Sealant™.

2.7 INSULATION

A. Insulation shall be formaldehyde free fiberglass blanket or batt insulation meeting ASTM C991 Type 1, ASTM E136 and ASTM E84.

PART 3 – EXECUTION

3.1 ROOF SYSTEM

- A. Existing buildings often have light fixtures, electrical conduits, fire sprinkler system hangers, HVAC duct supports, etc. which may be attached to the roof structure. Planning momentary disconnection and reattachment of such items shall be included in the scope of the project. Items that are not possible to temporarily disconnect may be left in place and a field splice made on the closest purlin, sealed and fastened for permanent attachment. Items to be permanently removed are noted on the project drawings or in the specifications. The responsibility for removal and disposal shall also be noted if other than the ceiling insulation contractor; electrical, plumbing, or HVAC contractors may be required to be employed to perform such items of work.
- B. Receive, inventory and store materials in a secure weatherproof environment. Store materials off the floor or ground if there is any risk of water damage from rain, flood, etc. Cut to length and install the painted steel straps or other support strapping if specified under "Products" or above in the pattern and spacing as shown on the project shop drawings. The straps are installed in tension, perpendicular to and at the bottom plane of the roof purlins. Position the pre-folded liner fabric on the strap platform, pull the liner system fabric out of its fold and fasten the fabric to the overlying purlins with the appropriate fastener. Liner system fabric shall be installed neatly and as wrinkle free as possible. Install the insulation materials on the fabric and strap platform at the specified thickness required to yield the resultant R-value of the insulation specified. Seal, fasten and trim the edges of the fabric liner to complete the installation.

END OF SECTION 07211

15000 - GENERAL PROVISIONS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The General Conditions, Special Conditions and Supplemental Conditions of the specifications are binding on this section of the work.
- B. The drawings and specifications are complementary to each other and what is called for by either shall be as binding as if called for by both.
- C. This contractor shall provide qualified supervision, skilled labor, quality material, machinery, plant, and any other items necessary to install a complete, safe, and quietly operating mechanical system. **All required contractor certifications shall be submitted at the Owner's first Contract Requirements Meeting. This includes, but is not limited to, all factory authorized training.**
- D. Prior to bid, this contractor shall examine all sections of the specifications and the complete set of contract drawings and bring to the attention of the Architect any omission or conflicts effecting this division of the work.
- E. Prior to final inspection, the Contractor shall complete all training required under this division; shall submit all prior inspection reports with the General Contractors signature indicating all items have been completed/corrected; the Test and Balance report shall be submitted to the Architect and reviewed by the Engineer.

1.2 CODES, STANDARDS, PERMITS, FEES, APPLICABLE STANDARDS

- A. The Contractor shall comply with the latest edition of the regulations of the National Electrical Code, the NFPA 13, 14, 20, 24, 90a, 90b, the International Building Code, the International Plumbing Code, the International Fuel Gas Code, the International Mechanical Code in the performance of his work wherever these regulations may apply.
- B. The work under this Division shall meet the minimum requirements of ASHRAE 90.1-2004 and/or the minimum equipment types and efficiencies as stated in the specifications or shown on the plans. The Contractor shall be responsible to correct any deficiencies, discrepancies or quality of work issues as determined by the Architect/Commissioning Authority/Engineer/Owner arising during the construction phase, test and balance phase, commissioning phase or warranty period of the project as required to meet or maintain the systems operation / integrity / quality at no additional cost to the Owner.
- C. The Contractor shall comply with ASHRAE Guides and all local codes, municipal, state, and Federal laws that apply to this construction project.
- D. The Contractor shall give all required notices, obtain all required permits, pay all required fees, and comply with local inspection requirements. Deliver to the Architect permits, licenses, certificates of test. Certificates from local and state health departments approving complete water and sanitary systems where applicable, and certificates from local fire department or state deputy fire marshal approving the fire protection system and equipment.
- E. Compliance: When materials or equipment must conform to the standards of organizations such as the American National Standards Institute (ANSI), American Society for Testing and Materials

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(ASTM), National Electric Manufacturers Association (NEMA), and Underwriters Laboratories (UL), proof of such conformance shall be submitted to the Engineer for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections.

- F. Construction Standards and/or Codes: The latest editions of standards and/or codes referenced, with all amendments as of the date of the opening of bids, shall govern the installation of all work and are adopted and incorporated into the contract documents and made a part thereof by reference, provided, however, that the drawings and specifications shall be adhered to in all cases where they call for quality of materials, quality of workmanship, or quality required by such standards and/or codes, and provided also that there may be no variances from the plans and specifications except to the extent that the said variance shall be necessary in order to comply with such standards and/or codes. It shall be the responsibility of the Contractor to familiarize himself with the requirements of such standards and/or codes. If there are any express requirements in the plans or specifications which are at variance therewith, all changes in the work necessary to eliminate the said requirements and make the work conform to standards and/or codes shall be accomplished in the manner provided in the contract for changes in the work.
- G. During construction and at completion of the work, the Contractor shall perform test(s) as called for in other sections of this specification. Perform any and all additional test(s) that the Owner/Architect/Engineer may consider to be necessary. Should it develop during testing that parts of the work are defective or does not comply with the specifications, such changes to the work as are necessary shall be made to put the work in condition to comply. Such work and required additional testing shall conform to the requirements of Section 00150, Instructions to Bidders (AIA Documents A701), Article 13 Miscellaneous Provisions, Paragraph 13.5 Tests and inspections.
- H. The following requirements are supplementary to the test specified for individual equipment and/or systems in this section of the specifications:
1. Concealed or insulated work shall remain uncovered until required test(s) have been completed, but in the event that the project construction requires it, the Contractor shall arrange for test(s) on portions of the work as the project schedule progresses.
 2. The Architect and Owner shall be notified in writing prior to all tests and shall be represented at such test. Written notification shall be submitted no less than 72 hours prior to requested test times. No test shall be performed without the Architect/Owner's representatives present unless the Architect/Owner have stated in writing that they will not be in attendance. The cost of labor, material, instruments, etc. required for testing shall be borne by the Contractor, except where specified elsewhere.
 3. Acceptance test for operation and performance as specified and/or required for all equipment and systems shall be in the presence of the Architect, an Owners representative, as well as representatives of local authorities having jurisdiction.

1.3 DRAWINGS:

- A. Project drawings accompanying this specification are generally diagrammatic and do not show all details of bolts, nuts, connections, fittings, offsets, and the like required for the complete system and do not indicate the exact location of piping, fixtures, equipment, etc., unless dimensioned or noted. While these drawings shall be followed as closely as possible, all dimensions shall be checked at the building and any necessary changes shall be made in accord with structural and architectural conditions, the equipment to be installed, or with the work of other trades, without any additional cost to the Owner. The drawings and specifications are complimentary to the other

and what is called for by one shall be as binding as if called for by both. Any component item under this contract shall be furnished and installed by the Contractor without extra charge.

1.4 EXAMINATION OF CONDITIONS:

- A. The contractor agrees, by submitting his bid, that he is satisfied by his careful examination as to the nature and location of the work; the condition of the ground; the character, quality, and quantity of the materials to be encountered; the general and local conditions; and all other matters which can affect the work under this contract.

1.5 COORDINATION:

- A. Mechanical, Plumbing, Fire Protection and Electrical Contractors shall coordinate work with all trades to avoid interference and establish necessary space requirements and tie-ins for each trade. The Mechanical Contractor, in a coordinated effort with all trades, shall submit coordinated drawings of the plans including below grade installations. The drawings shall be "printed" with backgrounds (architectural) features in a "light" line-weight with building systems (duct, piping, conduit, etc.) shown in a "heavy" line-weight; to scale, minimum $\frac{1}{4}" = 1'-0"$; and shall include the following detail:

1. Ductwork size (including liner and/or insulation)
2. Bottom and top of ductwork elevations
3. Centerline of piping elevations
4. Structural member type, size, and bottom/top elevations
5. Dimensions indicating locations of ductwork, equipment, piping, etc. (in relation to column lines or building exterior).
6. Hanger/support type, size, and locations
7. Centerline of conduit elevations
8. Equipment with tag, shown actual size, dimensioned, with accessories, elevations
9. Recessed light fixtures
10. Cable tray

- B. When trades are coordinating in above ceiling or attic spaces, priority shall be given to trades as follows:

1. Sloped piping (waste piping, roof drain leaders, etc.)
2. Fire sprinkler main headers
3. Ductwork
4. Piping 2-1/2" or larger
5. Electrical conduit 2" or larger
6. Cable Tray
7. Branch piping
8. Electrical conduit 1-1/2" or smaller

- C. Prior to starting installation, furnish to the General Contractor or Construction Manager, copies of approved shop drawings showing location of piping, equipment, etc. for review by the Architect.

- D. **The General Contractor shall schedule a minimum of two (2) meetings per month with all trades prior to and during installation so as to avoid conflicts and assure that pipes, conduits, equipment, etc. are installed in the best manner, taking into consideration head-room, maintenance, service, replacement, and appearance. The superintendent for the General Contractor along with the superintendents of the Mechanical, Electrical, Plumbing and Fire Protection Sub-contractors shall be in attendance at ALL coordination meetings. When the presence of the Controls Contractor is required, notice shall be given to the Architect in**

writing a minimum of one week in advance of the scheduled meeting. If Contractor desires, electronic files shall be made available through the Engineer's office upon receipt of a signed release form and a processing fee of \$75 per sheet.

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1.6 TRAINING:

- A. All training required under this division shall be completed prior to final acceptance by the Owner.
- B. Training shall be considered complete when the Owner confirms adequate information to operate and maintain referenced system(s) has been conveyed.
- C. All training materials shall be submitted to the Architect for review by the Engineer. A copy of all training materials shall be placed into the final O & M documents.

1.7 RECORD DOCUMENTS:

- A. A set of working redline as-built plans shall be on the job site during working hours and shall be available for the Engineer/Architect/Owner to review upon request. Any variation to the Construction Documents outside of a $\pm 6"$ tolerance shall be documented on the redlines. At the completion of the project, the documents shall be submitted to the owner along with the O & M Manuals.
- B. Upon project completion, all changes noted above shall be recorded neatly, with red ink, by the Contractor on an unused set of Contract Documents and submitted to the Architect. This project shall not be considered complete until the updated record documents have been received and reviewed by the Engineer. The reviewed Project Record Documents shall then be returned to the Architect and shall be submitted to the Owner along with the O & M Manuals.

1.8 PROJECT MANAGEMENT:

- A. Provide a designated project manager who will be responsible for the following:
 - 1. Construct and maintain project schedule.
 - 2. On-site coordination with all applicable trades and subcontractors.
 - 3. Authorized to accept and execute orders or instructions from Owner/Architect.
 - 4. Attend project meetings as necessary to avoid conflicts and delays.
 - 5. Make necessary field decisions relating to this scope of work.
 - 6. Coordination/Single point of contact.

END OF SECTION 15000

15010 - MECHANICAL PROVISIONS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. The provisions of the Instruction to Bidders and of the Special Conditions, General Conditions, and Supplementary Conditions of this specification shall govern the work in this division. The attention of this Contractor is directed to the Supplementary Conditions concerning substitution of materials and equipment.

1.2 MATERIALS

- A. Material References: Equipment or materials are described by reference to manufacturer's published data, such data will be used as the basis for comparison with proposed substitute equipment or material. Such publications are available for review in the offices of the Engineers, and the Contractor is referred to them for full information.
- B. Use of Substitute Equipment or Materials: Manufacturer's seeking prior approval shall submit in accordance with the procedures as defined in the Instructions to Bidders, 3.3 Substitutions. The submittals shall include performance data, noise criteria, internal wiring diagrams, rough-in dimensions, space requirements, construction features and external wiring and piping connections. The submittals shall also include a line-by-line comparison of equipment/materials in the same format and language of referenced specification section. The mechanical, electrical, structural, architectural, space conditions and other features of the overall project design have been based on the requirements of the scheduled products. In addition to the equipment/material comparisons, the Contractor shall submit for approval a schedule setting forth in what respects the overall project design (mechanical, electrical, structural, architectural or space conditions) must be modified in order to permit proper installation and operation of the submitted products. Extensive or unreasonable modifications shall be considered cause for rejection of such products. In the event the substitute equipment/materials are approved, the Contractor shall bear all costs for requested changes related to the aforementioned systems and space conditions.
- C. Material List: Within thirty (30) days after award of the contract, the Contractor shall forward to the Engineer a complete list of all materials and equipment to be used in the work. The intent to use the exact material or equipment scheduled or specified does not eliminate the responsibility for submitting such a list. Should the Contractor fail to submit such a list, then the right is reserved for the Engineer to select a full line of material and equipment which shall be used in the work at no additional cost to the Owner.

1.3 GENERAL REQUIREMENTS

- A. Mechanical Drawings: The drawings specifically applicable to "Mechanical" are identified by the prefix "M" and "P". The Contractor shall refer to all other drawings for additional details such as ceiling heights, finishes, dimensions, building materials, door openings, and other architectural, structural, mechanical and electrical features which may affect "Mechanical".
- B. Interference: The mechanical drawings are generally diagrammatic and the Contractor shall provide offsets in the work so that interferences between piping, ducts, conduit, equipment, apparatus, architectural, and structural work will be avoided.
- C. Shop Drawings: Shop drawings required under "Mechanical" shall be included in a single submittal brochure including outline drawings, descriptive literature and/or specification data

covering plumbing fixtures, major components of each mechanical system, insulation, and specialty items. Data shall show performance, internal wiring diagrams, roughing-in dimensions, space requirements, construction features and external wiring and piping connections. Where data includes information not applicable to this project, the information which is applicable shall be clearly identified for easy reference. A cover sheet shall be included, listing manufacturer and model number of each item submitted.

- D. Existing Utilities and/or Concealed Work: The locations, sizes, elevations, and other data indicated on the drawings relative to existing utilities and/or other work below the surface of the ground or in otherwise concealed locations are based on the information available during the design. Should actual conditions be at variance to conditions indicated by the drawings and specifications, all changes in work necessary to correct such variance and make the work conform to actual conditions shall be accomplished in accordance with applicable portions of the contract documents.
- E. Space Conditions:
1. All piping, ductwork, apparatus, equipment, and related work shall fit properly into the provided spaces in the building or property, and shall be introduced into the spaces at such time and in such manner as to not cause damage to the building structure or property.
 2. The Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. This provision includes, but is not limited to, valves, traps, cleanouts, motors, controllers, drain points, etc.
- F. Excavation, Trenching, and Backfilling: All excavation, trenching, and backfilling necessary to receive any mechanical work shall be provided hereunder, and shall be performed in strict accordance with the applicable requirements of another division.
- G. Painting: Any required painting, except for the standard factory coat furnished on equipment, touch-up painting, and/or other painting as may be expressly required hereunder, will be provided under section entitled, "Painting"; however, the Contractor shall leave all mechanical work and equipment clean and free of any grease, dirt, rust, and other foreign matter and in suitable condition for proper painting.
- H. Access Doors: Access doors shall be furnished to provide access for service and maintenance of any concealed valves, cleanouts, air vents, or other equipment normally requiring servicing or maintenance, and for which other means of ready access is not built into the building or structure.
- I. Roof Flashing: Pipes, ducts, or other mechanical work passing through the roof shall be flashed and made water-tight in a manner approved by the manufacturer of the roofing material and complying with roof bond requirements.
- J. Equipment Supports and/or Foundations: Unless expressly stipulated otherwise, provide all supports, concrete foundations and/or pads required for proper installation of the equipment furnished under "Mechanical". Concrete work shall conform in all applicable detail to the requirements of "Concrete". Foundations requiring anchor bolts shall be constructed with such anchor bolts securely embedded in the concrete. Bolts shall have bottom plates and pipe sleeves unless otherwise detailed on the mechanical drawings.
- K. Controls, Switches, Starters, Etc.: Shall be identified with etched plastic or other permanent type nameplate as approved. Nameplate shall show function, system, etc.
- L. Operating and Maintenance Data and Instructions:

1. Prior to making request for final inspection, the Contractor shall put all mechanical systems and equipment into operation, and shall make all tests and adjustments. The Contractor shall furnish proper instructions to the Owner concerning operation and maintenance of all mechanical and related electrical equipment.
2. For all items of mechanical or related electric equipment or apparatus installed which requires operation of maintenance after occupancy, the Contractor shall furnish four (4) complete brochures and data as prepared and published by the manufacturer covering details of operation and maintenance. Brochures and data shall be delivered to the Engineer for transmittal to the Owner.
3. Each brochure shall contain one (1) copy of each "shop drawing". Shop drawings as originally submitted and approved shall be revised if necessary to reflect the work "as-built". Where brochures and data include information not applicable to this contract, the information which is applicable shall be clearly identified for easy reference.

1.4 ELECTRICAL APPARATUS AND WIRING

- A. Motors: Motors shall conform in all respect to the latest applicable standards of NEMA and IEEE and shall be the type most suitable for the equipment and/or machinery they are to operate. Each motor shall have sufficient capacity to start and operate the equipment and/or machinery it drives without its required brake horsepower exceeding the motor nameplate rating at the specified speed or at any speed and load which may be obtained by the drive actually furnished. Motor horsepowers scheduled on the drawings are estimated as a guide to approximate requirements; however, actual motors furnished shall be selected to comply with the requirements of this paragraph.
- B. Except as may be otherwise specified, each motor furnished hereunder shall be complete with a motor starter of proper type for the intended service. Motor starter shall comply with the requirements of NEMA and IEEE, and shall be equipped with proper thermal overload elements. Unless stipulated otherwise hereinafter and/or on the mechanical drawings, or required by the specific requirements of the motor and drive, starters shall comply with the following:
 1. Starters for motors 1/2 hp and larger and/or motors controlled by automatic devices shall be of the fully enclosed, general purpose surface mounting, full voltage, across-the-line, magnetically operated type.
 2. Where the motor is automatically controlled, the starter shall be provided with a three-position "Hand-Off-Automatic" switch mounted in the case.
 3. Where the motor is manually controlled from a remote location, a magnetic starter and flush mounted remote push-button station with pilot light shall be provided.
 4. Where the motor is manually controlled at the starter, a "Start-Stop" push-button shall be provided in the cover of magnetic starters.
 5. Where "reduced voltage" starters are indicated they shall be of the type specified hereinafter or indicated on the drawings.
- C. Installation:
 1. Unless expressly stipulated otherwise, electrical apparatus (motors, electric space heating equipment and/or other electrical equipment) furnished under "Mechanical" shall be installed under "Mechanical".
 2. All power wiring for electrical apparatus furnished under "Mechanical", including necessary circuit breakers or fused disconnect switches not furnished integral with the equipment, will be provided under "Mechanical". Coordinate final connection with Electrical.
 3. Starters, controllers and/or other control devices furnished under "Mechanical" for field installation in power wiring shall be installed under "Electrical".

4. All inter-control wiring, associated control system wiring and pilot circuit wiring required to accomplish any control sequence specified under "Mechanical" and/or shown on the mechanical drawings shall be provided under "Mechanical".
 - a. Associated control system wiring is defined as that wiring which is necessary to power or control any electrical-pneumatic or other electric control device furnished under "Mechanical".
 - b. Pilot circuit wiring is defined as that wiring which is necessary to power or control any starter and/or other controller furnished under "Mechanical" and interposed in the wiring to the electrical apparatus. For example, the wiring between a remote push-button station and a magnetic motor starter, including wiring through any safety or other auxiliary control devices interposed in such wiring, is considered pilot circuit wiring.
 5. Any remote push-button stations and/or control devices provided under "Mechanical" and not interposed in the power wiring shall be installed under "Mechanical".
 6. Conduit and outlet boxes for wiring provided under "Mechanical" will be provided under "Electrical" only when specifically indicated on the electrical drawings. Conduit and outlet boxes not so indicated on the electrical drawings shall be provided under "Mechanical".
 7. Any wiring, conduit and outlet boxes provided under "Mechanical" shall be in strict accordance with all applicable requirements of "Electrical", provided however:
 - a. Line voltage and exposed wiring shall be run in conduit;
 - b. No splices will be allowed except at junction boxes and control centers;
 - c. No two wires of the same color shall be run in one conduit unless all wires of the same color are properly tagged at both ends and any splice points.
- 1.5 BELT DRIVES
- A. Each motor driven machine not directly connected to its driving motor shall be equipped with a V-belt drive of rating as recommended by the manufacturer for the service. For variable speed drives, the horsepower rating shall be based on the specified mid-position operating conditions.
 - B. Variable and adjustable pitch sheaves shall, unless otherwise specified, be selected so that the required RPM will be obtained with the sheave set approximately in mid-position.
 - C. Each belt drive shall be provided with an approved guard.
- 1.6 MISCELLANEOUS PROVISIONS
- A. Definition: Unless otherwise defined or modified on the drawings, the word "exposed" shall be interpreted to mean all piping, ducts, equipment, and similar work which is not concealed within the building walls, floors, or ceilings or above suspended ceilings or behind furring or buried in the ground.
 - B. Certification: When the work of this Division 15 is completely balanced and in permanent operating condition, the Contractor shall submit certification in six (6) copies to the Engineer that the system is installed in accordance with drawings, specifications and manufacturer's recommendations and that safety and operating controls are functioning properly.

END OF SECTION 15010

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15015 - SEISMIC PROTECTION FOR MECHANICAL PIPING, DUCTWORK AND EQUIPMENT

PART 1 - GENERAL

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.1 GENERAL

- A. The Contractor shall install all mechanical equipment in accordance with the design detail provided by a seismic engineer. The Engineer shall be registered, shall be experienced in the design of site-specific seismic protection of mechanical equipment and piping and shall be employed by and responsible to the appropriate mechanical (HVAC or plumbing) sub-contractor.

END OF SECTION 15015

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15030 - START-UP OF MECHANICAL SYSTEMS

PART 1 - GENERAL

1.1 ADJUSTMENTS AND TESTS

- A. All piping systems for which specific tests have not been specified shall be tested hydrostatically and proved mechanically sound and free from leaks. Test pressure for such tests shall be 150% of the design working pressure of the line, but in no case less than 125 psig.
- B. Balance all water circulating systems so that quantities circulated will be as specified.
- C. Adjust and balance all duct systems so that air quantities at all inlets and outlets are as indicated and so that air distribution over entire cross sectional areas of conditioned spaces are draft free.
- D. Permanently mark all dampers and adjusting devices so that they can be restored if disturbed at any time.
- E. Adjust all equipment to perform as specified and as required to give satisfactory results.
- F. Upon completion of construction and testing, properly clean all cleanable type filters and leave in as new condition. Replace all throwaway filters with new, previously unpackaged filters.
- G. Contractor shall provide all instruments and facilities for performing all required tests in an approved manner.
- H. Comply with start-up requirements as stated in individual equipment specifications. This includes, but is not limited to, chillers, air handling units, packaged roof top units, fans, pumps, etc.

1.2 INSTRUCTIONS

- A. Provide and mount on the equipment or storage room wall a suitable #16 gauge metal cabinet with hinged cover and push button latch. Cabinet shall be designed for permanent storage of one (1) complete set of all required installation, operating and maintenance instructions which shall be enclosed therein by the Contractor. Cabinet shall be finished with a hammered gray baked-on enamel.

END OF SECTION 15030

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15035 - VIBRATION AND NOISE CONTROL

PART 1 - GENERAL

1.1 SCOPE

- A. Unless otherwise specified or noted on drawings, all mechanical equipment shall be mounted on vibration isolators to prevent the transmission of vibration and mechanically transmitted sound to the building structure. Vibration isolators shall be selected in accordance with the weight distribution so as to produce reasonably uniform deflection. Deflections shall be as noted on drawings or as specified hereinafter.

1.2 MANUFACTURER

- A. Vibration and noise control equipment specified hereinafter shall be as manufactured by Mason Industries, Inc. Equal products of Korfund, Peabody or Vibration Mountings & Controls will be acceptable.

PART 2 - PRODUCTS

2.1 VIBRATION MOUNTINGS

- A. Type A: Double deflection neoprene mountings shall have a minimum static deflection of 0.35". All metal surfaces shall be neoprene covered to avoid corrosion and have friction pads both top and bottom so they need not be bolted to the floor. Bolt holes shall be provided for these areas where bolting is required. On equipment such as small vent sets and close coupled pumps, steel rails shall be used above the mountings to compensate for the overhang. Mountings shall be Type ND or rails Type DNR as manufactured by Mason Industries, Inc.
- B. Type B: Spring type isolators shall be free-standing and laterally stable without any housing and complete with 1/4" neoprene acoustical friction pads between the baseplate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8" of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include spring diameters, deflections, compressed spring height and solid spring height. Mountings shall be Type SLF as manufactured by Mason Industries, Inc.
- C. Type C: Equipment with operating weight different from the installed weight, such as chillers, boilers, etc., and equipment exposed to the wind, such as cooling towers, shall be mounted on spring mountings as described for Type B, but a housing shall be used that includes vertical limit stops to prevent spring extension when weight is removed. The housing shall serve as blocking during erection, and cooling tower mounts shall be located between the supporting steel and roof or the grillage and dunnage as shown on the drawings. The installed and operating heights shall be the same. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and spring so as not to interfere with the spring action. Limit stops shall be out of contact during normal operations. Mountings used out-of-doors shall be hot dipped galvanized. Mountings shall be Type SLR as manufactured by Mason Industries, Inc.

2.2 VIBRATION HANGERS

- A. Type D: Vibration hangers shall contain a steel spring and 0.3" deflection neoprene element in series. The neoprene element shall be molded with a rod isolation bushing that passes through

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the hanger box. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30 degree arc before contacting the hole and short circuiting the spring. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include a scale drawing of the hanger showing the 30 degree capability. Hangers shall be Type 30N as manufactured by Mason Industries, Inc.

- B. Type E: Vibration hangers shall be as described for Type D, but they shall be precompressed to the rated deflection so as to keep the piping or equipment at a fixed elevation during installation. The hangers shall be designed with a release mechanism to free the spring after the installation is complete and the hanger is subjected to its full load. Deflection shall be clearly indicated by means of a scale. Submittals shall include a scale drawing of the hanger showing the 30 degree capability. Hangers shall be Type PC30N as manufactured by Mason Industries, Inc.
- C. Type F: Vibration hangers shall contain a steel spring located in a neoprene cup manufactured with a grommet to prevent short circuiting of the hanger rod. The cup shall contain a steel washer designed to properly distribute the load on the neoprene and prevent its extrusion. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 20 degree arc before contacting the hole and short circuiting the spring. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Hangers shall be provided with an eye bolt on the spring end and provision to attach the housing to the flat iron duct straps. Submittals shall include a scale drawing of the hanger showing the 30 degree capability. Hangers shall be Type W30 as manufactured by Mason Industries, Inc.

2.3 HORIZONTAL THRUST RESTRAINTS

- A. Type X: Where indicated, handling equipment shall be protected against excessive displacement which might result from high air thrusts in relation to the equipment weight. The horizontal thrust restraint shall consist of a spring element in series with a neoprene pad as described in Specification B with the same deflection as specified for the mountings or hangers. The spring element shall be contained within a steel frame and designed so it can be preset for thrust at the factory and adjusted in the field to allow for a maximum of 1/4" movement at start and stop. The assembly shall be furnished with one rod and angle bracket for attachment to both the equipment and ductwork or the equipment and the structure. Horizontal restraints shall be attached at the centerline of thrust and symmetrically on either side of the unit. Horizontal thrust restraints shall be Type WB as manufactured by Mason Industries, Inc.

2.4 BASES

- A. Type G: Vibration isolator manufacturer shall furnish integral structural steel bases. Bases shall be rectangular in shape for all equipment other than centrifugal refrigeration machines and pump bases which may be 'T' or 'L' shaped. Pump bases for split case pumps shall include supports for suction and discharge base ells. All perimeter members shall be beams with a minimum depth equal to 1/10th of the longest dimension of the base. Beam depth need not exceed 14" provided that the deflection and misalignment is kept within acceptable limits as determined by the manufacturer. Height saving brackets shall be employed in all mounting locations to provide a base clearance of 1". Bases shall be Type WF as manufactured by Mason Industries, Inc.
- B. Type H: Vibration isolator manufacturer shall provide steel members welded to height-saving brackets to cradle machines having legs or bases that do not require a complete supplementary base. Members shall be sufficiently rigid to prevent strains in the equipment. Inverted saddles shall be Type ICS as manufactured by Mason Industries, Inc.
- C. Type J: Vibration isolator manufacturer shall furnish rectangular structural beam or channel concrete forms for floating foundations. Bases for split case pumps shall be large enough to

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provide support for suction and discharge base ells. The base depth need not exceed 12" unless specifically recommended by the base manufacturer for mass or rigidity. In general, bases shall be a minimum of 1/12th of the longest dimension of the base, but not less than 6". Forms shall include minimum concrete reinforcement consisting of ½" bars or angles welded in place on 6" centers running both ways in a layer 1-1/2" above the bottom, or additional steel as is required by the structural conditions. Forms shall be furnished with steel members to hold anchor-bolt sleeves when the anchor bolts fall in concrete locations. Height saving brackets shall be employed in all mounting locations to maintain a 1" clearance below the base. Bases shall be Type K as manufactured by Mason Industries, Inc.

2.5 CURB-MOUNTED BASES

- A. Type Y: Where indicated, curb-mounted rooftop equipment shall be mounted on vibration isolation bases that fit over the roof curb and under the isolated equipment. The extruded aluminum top member shall overlap the bottom member to provide water runoff independent of the seal. The aluminum members shall house cadmium plated springs having a 1" minimum deflection with 50% additional travel to solid. Spring diameters shall be no less than 0.8" of the spring height at rated load. Wind resistance shall be provided by means of resilient snubbers in the corners with a minimum clearance of 1/4" so as not to interfere with the spring action except in high winds. The weather seal shall consist of continuous closed cell sponge materials both above and below the base and a waterproof flexible ductlike EPDM connection joining the outside perimeter of the aluminum members. Foam or other contact seals are unacceptable at the spring cavity closure. Caulking shall be kept to a minimum. Submittals shall include spring deflections, spring diameters, compressed spring height and solid spring height as well as seal and wind resistance details. Curb-mounted bases shall be Type CMAB as manufactured by Mason Industries, Inc.
- B. Type Z:
 1. Where indicated, curb-mounted rooftop equipment shall be mounted on vibration isolation bases that fit over the roof curb and under the isolated equipment. The extruded aluminum top and bottom members shall contain cadmium plated springs having a 1" minimum deflection with 50% additional travel to solid. Spring diameters shall be no less than 0.8" of the spring height at rated load. Springs shall be located at maximum intervals of 2' and shall be so selected that the total force of all the springs in the base system amounts to no more than 20% of the total weight of the mounted unit. Wind resistance shall be provided by means of resilient snubbers in the corners with a minimum clearance of 1/4" so as not to interfere with the spring action except in high winds.
 2. The weather seal shall consist of continuous closed cell sponge materials both above and below the base and a waterproof flexible ductlike neoprene connection joining the outside perimeter of the aluminum members. Foam or other contact seals are unacceptable at the spring cavity closure.
 3. Eighty percent (80%) of the weight of the equipment shall be taken by four (4) springs having a minimum deflection of 3-1/2" that are seated on steel bridging members that pass over the top of the unit. These springs shall be used in series with neoprene pads and shall have all the characteristics of the springs described above except that they shall be hot-dipped galvanized rather than cadmium plated. Attachment to the unit shall be by leans of 1" threaded rods attached to the unit's lifting lugs by means of clevises. The cross members shall be supported by four (4) columns, which in turn are resting on load distributing beams that run the length of the roof curb on either side of the unit. The beams shall be cemented to continuous 1/4" thick waffle neoprene pads so as not to cut the roof membrane.
 4. Submittals shall include all spring deflections, spring diameters, compressed spring height and solid spring height as well as seal and wind resistance details. The sealing

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curb shall be Type CMAB and the 3-1/2" deflection springs Type IM, all as manufactured by Mason Industries, Inc. The vibration vendor shall furnish the steel structure with calculations showing that the roof supported beams will reflect no more than 1/360th of the span if supported at the ends as simple members with similar maximum deflection limitations for the upper bridging members. All structural steel members shall be primed with red lead paint prior to shipment.

2.6 FLEXIBLE PIPE CONNECTIONS

Deleted: ¶

A. Type K:

1. Flexible neoprene connectors shall be provided on equipment as indicated or specified. They shall be manufactured of multiple plies of nylon tire cord fabric and neoprene both molded and cured in hydraulic rubber presses. No steel wire or rings shall be used as pressure reinforcement. Straight connectors shall have two spheres. Connectors up to and including 1-1/2" diameter may have threaded ends. Connectors 2" and larger shall be manufactured with floating galvanized flanges recessed to lock the connector's raised face neoprene flanges. Hoses shall be installed on the equipment side of the shutoff valves.
2. Connectors shall be rated a minimum of 150 psi at 220°F. Flanged equipment shall be directly connected to neoprene elbows in the size range 2-1/2" through 12" if the piping makes a 90 degree turn at the equipment. All straight-through connections shall be made with twin-spheres properly pre-extended as recommended by the manufacturer to prevent additional elongation under pressure. 12" and larger sizes operating above 100 psi shall employ control cables with end fittings isolated by means of 1/2" thick bridge bearing neoprene washer bushings designed for a maximum of 100 psi.
3. Submittals shall include two test reports by independent consultants showing minimum reductions of 20 db in vibration accelerations and 10 db in sound pressure levels at typical blade passage frequencies.
4. Elbows shall be Mason-Flex Type MFNEC, straight connectors Mason-Flex Type MFTFU or MFTNC, and control cable assemblies Type ACC, all as manufactured by Mason Industries, Inc.

B. Type L: Flexible stainless steel hoses shall be provided where indicated or specified.

1. Hoses shall have stainless steel braid and carbon steel fittings. Sizes 3" and larger shall be flanged. Smaller sizes shall have male nipples. Lengths shall be as tabulated:

<u>Flanged</u>		<u>Male Nipples</u>	
3 x 14	10 x 26	1/2 x 9	1-1/2 x 13
4 x 15	12 x 28	3/4 x 10	2 x 14
5 x 19	14 x 30	1 x 11	2-1/2 x 18
6 x 20	16 x 32	1-1/4 x 12	
8 x 22			

2. Hoses shall be installed on the equipment side of the shutoff valves horizontally and parallel to the equipment shafts wherever possible. Hoses shall be Type BSS as manufactured by Mason Industries, Inc.

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PART 3 - EXECUTION

3.1 INSTALLATION

- A. All noise and vibration control equipment shall be installed in strict accordance with manufacturer's recommendations and instructions.

END OF SECTION 15035

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15200 - THERMAL AND/OR ACOUSTICAL INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Attention is directed to Section 15220.
- B. The work of this Section consists of insulation of all hot and cold surfaces subject to heat loss, heat gain or condensation.

PART 2 - MATERIALS

2.1 MANUFACTURER

- A. Products of CertainTeed, Owens-Corning or Johns-Manville, specified hereinafter are acceptable.

2.2 FIRE AND SMOKE HAZARD RATINGS

- A. All insulation, unless specifically excepted hereinafter, shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing of jacket to the insulation) fire and smoke hazard ratings as tested by procedure in UL 723 and ASTM E-84, not exceeding:

Flame Spread	25
Smoke Developed	50
Fuel Contribution	50

- B. Accessories, such as adhesives, mastics, cements and tapes for fittings shall have the same component ratings as listed above.
- C. All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed above requirements.
- D. Any treatment of jackets or facings to impart flame-and-smoke safety shall be permanent. Use of water-soluble treatments is prohibited.
- E. The Contractor shall certify in writing, prior to installation, that all products to be used will meet the above criteria.

PART 3 - EXECUTION

3.1 APPLICATION - GENERAL

- A. Execution of the work shall be by the insulation manufacturer or contractors specializing in the installation of insulation. The installing contractor shall submit their qualifications and certifications with the insulation submittals for the Engineer to review.
- B. Insulation shall not be applied until equipment, piping, and ducts have been inspected and released for application.
- C. Insulation shall be applied on clean, dry surfaces.

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- D. All insulation shall be continuous through wall and ceiling openings and sleeves.
- E. Insulation on all cold surfaces where vapor barrier jackets are used shall be applied with a continuous unbroken vapor seal. Hangers, supports, anchors, or other items that are secured directly to cold surfaces shall be insulated and vapor-sealed to prevent condensation.
- F. Any insulation that becomes wet shall be removed, disposed, and replaced.
- G. Insulation shall be stored on the job site in a manner as to protect it from dust, debris, damage, etc.

END OF SECTION 15200

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15220 - DUCT INSULATION

PART 1 - GENERAL

1.1 SCOPE

- A. This specification defines the materials and methods of the duct system insulation. Attention is directed to Section 15200 for General Insulation requirements.

1.3 DEFINITIONS

- A. "Concealed ductwork" is defined to be that portion of a duct system that is installed within ceiling spaces, building chases or in architecturally furred-in spaces.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Fiberglass duct insulation (duct wrap) shall be 3-inch thick, R-8 (installed) rated flexible blanket type with factory applied vapor barrier in unconditioned spaces (attics/exterior installations). Fiberglass duct insulation (duct wrap) shall be 2-inch thick, R-6 (installed) rated flexible blanket type with factory applied vapor barrier in semi-conditioned spaces (between ceiling and floor above/plenums). Vapor barrier shall be minimum 0.7 mil thick aluminum foil reinforced with fiberglass yarn mesh and laminated to 40-lb. chemically treated fire resistant Kraft (FRK).
- B. All insulation shall have a composite (insulation, jacket and adhesive used to adhere the jacket to the insulation) fire and smoke hazard rating, as tested by procedure in UL 723 and ASTM E 84, not exceeding:

Flame Spread	25
Smoke Developed	50
Fuel Contribution	50
- C. Accessories, such as adhesives, mastics, cements and tapes for seams, joints and fittings, shall have the same rating as listed herein.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All supply, return, exhaust and outside air ductwork shall be insulated.
- B. Duct wrap shall be applied with edges tightly butted and secured with outward clinch staples, 2-inches on center. All joints and seams shall be sealed with glassfab and mastic. On ducts over 24" wide or high, insulation shall be applied over pins welded or cemented to the ducts with all joints sealed with glassfab and mastic. Standing duct braces and other duct projections shall be insulated.
- C. Insulation shall be applied on clean, dry surfaces after the ductwork has been inspected and released for insulation application.
- D. All insulation shall be continuous through wall and ceiling openings and sleeves.

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- E. Insulation on all cold surfaces where vapor barrier jackets are used shall be applied with a continuous unbroken vapor seal. Hangers, supports, anchors, or other items that are secured directly to cold surfaces must be insulated and vapor sealed to prevent condensation.
- F. Insulation shall be protected from physical damage at points of support where the insulation must carry the load imposed by the support. Coordinate this requirement with the installation of hangers and supports.

END OF SECTION 15220

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15805 - AIR DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 SCOPE

- A. All ductwork shall be galvanized steel.

1.2 SMACNA GUIDELINES AND CODES

- A. Complete systems of ductwork shall be fabricated and installed in accordance with the recommended and standard practices contained in the latest edition of the SMACNA "HVAC Duct Construction Standards – Metal and Flexible" as published by the Sheetmetal and Air Conditioning Contractors National Association, Inc.
- B. Comply with International Mechanical Code, ASHRAE Guide, and local codes.

1.3 QUALITY ASSURANCE

A. SMACNA Standards:

1. Comply with SMACNA's "HVAC Duct Construction Standards, second edition".
2. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual".

- B. ASHRAE Standards: Comply with ASHRAE Systems and Equipment Handbook.

- C. NFPA Compliance: Comply with NFPA 90A "Standard for the installation of Air Conditioning and Ventilating Systems" and NFPA 90B "Standard for the Installation of Warm Air Heating and Air Conditioning Systems".

- D. Filter media shall be ANSI/UL 900 listed, Class 1 or Class 2, as approved by local authorities.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Ductwork: Except as may be specifically noted otherwise on the drawings, ductwork shall be constructed of galvanized steel conforming to ASTM A 653 with a galvanized coating of not less than 1-1/4 ozs. per sq. ft. for both sides. Minimum ductwork gage shall be 26. Gage shall be indicated on the ductwork. Class 1 flexible duct, complying with UL 181 may be used at diffuser connections in lengths not to exceed 5 feet. Flexible duct is not permitted to connect main ducts to terminal boxes. Ductwork aspect ratios shall generally 3 to 1, not to exceed 4 to 1.
- B. Elbows: Long radius elbows shall be used generally; however, vanned elbows shall be used where shown on the drawings and/or required to fit restricted spaces. Turning vanes in ductwork 18" or deeper shall be double wall and 1 gage heavier than installed ductwork. Single wall turning vanes gage shall be equal to ductwork. Short radius elbows are prohibited unless authorized by Engineer.
- C. Accessory Materials: Material for bracing angles, hangers and supports, rivets, screws and other fastening details shall be galvanized steel.

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- D. Balancing Dampers: Provide factory-fabricated balancing dampers with locking quadrants at all branch take-offs to facilitate balancing. Damper shall be 1 gage heavier than installed ductwork. Do not install a volume damper with a frame that protrudes into an airstream due to excessive noise and pressure drop. Dampers that are integral parts of supply diffusers are not permitted for balancing. Provide dampers at branches or takeoffs for balancing. Bright colored ribbons shall be tied to the damper quadrant for locations to be quickly identified. Ribbon shall hang down a minimum of 12".
- E. Air Distribution Devices: Furnish and install exhaust and supply grilles, registers and air diffusers as shown on drawings and as specified herein. All air distribution devices shall be Titus, Krueger, Price, or Metalaire.
1. Sound Power Level: Grilles, registers and diffusers shall meet the noise criterion sound level of the scheduled air device ± 2 NC in the occupied area but not to exceed the NC occupancy recommendations in the ASHRAE Guide. Selection and sizing of all grilles, registers and diffusers shall conform to the manufacturer's published performance data and meet scheduled requirements.
 2. Ceiling Supply Air Diffusers: Shall be of design and air pattern indicated on the drawings with volume control key operated from the face of the device. Provide each supply register and diffuser with an air turning device for deflecting air evenly into the throat of the device. All diffusers and registers shall be of aluminum construction.
 3. Return Air Grilles: Shall be of aluminum construction with sponge rubber gasket.
 4. All supply air devices shall be complete with opposed blade volume control dampers when a balancing damper cannot be installed in an accessible location or as noted on the drawings.
- F. Fire Dampers: Provide UL Listed fire dampers of suitable arrangement at any point of fire-rated wall/ceiling penetration.
- G. Louvers: Wall louvers shall be by Metalaire, Pottorff, or Greenheck. Refer to the drawings for louver sizes and performance. All wall louvers shall be provided with aluminum bird screen or aluminum insect screen as indicated.
- H. Flexible duct connections shall be provided at inlet and outlet connections to air handlers and fans.
- I. Duct Sealing Requirements: All supply, return and exhaust ductwork shall be Seal Class B unless required by SMACNA to be Seal Class A. Transfer ducts may be Seal Class C.

PART 3 - EXECUTION

3.1 DUCTWORK AND ACCESSORIES

- A. Ductwork and accessories shall be installed in strict accordance with NFPA 90A and SMACNA HDCS and shall be run approximately as indicated on drawings. Provide offsets and other field changes as necessary to suit the size of factory fabricated equipment actually furnished. Such changes shall be designed to minimize losses in pressure and performance due to sudden expansion and contraction. Transitions shall be used in field changes as well as modifications to connecting ducts.
- B. Duct shall be installed so that ductwork shall operate without chatter, vibration and be airtight so that no dust marks from air leaks will show at connections or outlets. All joints shall be sealed with approved duct sealer.

- C. Elbows, vaned elbows, take-offs, branch connections, transitions, duct volume dampers, flexible connections, other fittings and appurtenances shall conform to SMACNA Duct Construction Manual.
- D. Duct Supports:
1. Supports for concealed ducts shall be not less than 1 inch wide, 22 gauge, galvanized strap hangers spaced in accordance with SMACNA Duct Construction Standards. Hangers shall be installed under insulation with penetrations sealed with mastic. Ductwork 24" or wider shall be supported with angle iron held in place by threaded rod from structure. Angle iron and rod to comply with SMACNA standards based on size and weight of duct in addition to hanger spacing intervals.
 2. Ducts shall be supported and installed so as to be completely free from vibration under all conditions of operation. Supports shall be attached only to structural framing members.
- E. Round ducts shall be tapped into main duct with conical type fittings with volume dampers having a locking quadrant.
- F. Branches and Tee Connections: Provide 45° boot taps for rectangular to rectangular connections. Provide conical taps for round to rectangular and round to round connections. Conical tees shall be acceptable for round to round connections. **Saddle taps are prohibited.**
- G. Grille and Diffuser Connections: Adjustable dampers are included as accessories to be furnished with the air distribution devices.
- H. Volume Dampers: Install all dampers so that they are accessible for adjustment. Extend damper rod beyond insulation and provide locking device. Conspicuously mark damper rod for quick identification.
- I. Broken places in galvanized sheet metal coating made during forming shall be painted with zinc duct primer.
- J. Access Doors: Shall be hinged and latched. Access doors shall provide ready access to operating parts of any kind. Make doors air tight with a neoprene gasket. Insulate doors in insulated ductwork.
- K. Objectionable Noise, Vibration or Breathing of Ducts: Will not be permitted and the Contractor shall see that such objections are eliminated by anchoring and bracing all ductwork securely to building.
- L. Cleaning of Ducts: Before making final connections to air distribution outlets, the Contractor shall operate fans and shall thoroughly clean out the interior surfaces of all ducts.
- M. Flexible Duct Connections: Flexible connections shall be installed between fan units and metal ducts or casings, and shall comply with NFPA No. 90A.
- N. Temporary closure shall be provided at ends of ducts which are not connected to equipment or air devices at the time of installation. Provide temporary closure of polyethylene film or similar covering to prevent dust and debris from entering ductwork. Ductwork that is awaiting installation on the job site shall be covered with the same temporary closure.
- O. End runs of ductwork shall not extend more than 2" past last tap.

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- P. Slope exhaust duct connected to grilles in high moisture areas (showers, restrooms, pool areas, etc.) back towards grille. Slope shall be minimum 1/8" per foot.

3.2 TESTING

- A. Operate all fans and demonstrate quiet and vibration-free operation of duct system.
- B. Air Cleaning Devices: Systems shall not be operated during construction.
- C. Leakage Tests: Mechanical Contractor to conduct duct leakage test on all ductwork constructed to 2" pressure class or higher. Refer to plans for ductwork pressure class schedule. Leakage test shall be in accordance with SMACNA HVAC Air Duct Leakage Test Manual. Repair leaks and repeat tests until total leakage is less than the maximum permissible leakage for the pressure class as listed on the plans.
- D. Test Failures: Duct systems shall be repaired if test pressure and leakage requirements are not met or if air noise condition is encountered. Repairs and sealing shall be done with sheet metal, tape, sealant, or a combination thereof.
- E. Ductwork pressure tests shall be observed by Architect/Engineer/Owner or their designee prior to installation of insulation. All testing shall be documented and submitted to the Owner.

END OF SECTION 15805

SECTION 15875 - SPLIT-SYSTEM HEAT PUMP

PART 1 - GENERAL

1.1 SCOPE

- A. Complete year-round, all electric heating and cooling system completed in all respects and ready for operation.

1.2 WORKMANSHIP

- A. Only skilled and experienced workmen shall be utilized for this work. Any work that is not performed in accordance with standard and recommended practices shall be replaced at the expense of the Contractor. Coordinate with all other contractors prior to installing any item of equipment.

1.3 CODES, FEES, ETC.

- A. Comply with International Mechanical Code, ASHRAE Guide and local codes. Apply and obtain all permits and comply with local inspection requirements.

PART 2 - PRODUCTS

2.1 INDOOR SECTION

- A. The indoor unit shall be a variable speed type designed for (R-410A) refrigerant, Trane model as scheduled. No substitute shall be accepted. Air handler shall be constructed of galvanized steel and coated with baked enamel finish. The cabinet shall be insulated with neoprene coated fiberglass. The cabinet panels shall be easily removed for service to all components. The indoor unit shall be complete with direct expansion coil, variable speed centrifugal fan and motor and condensate collector, and shall be completely wired to terminal block. The capacity shall be as scheduled on the drawings. The indoor unit shall be provided with filter frame and throw-away filters unless noted otherwise. Filters shall be replaced at job completion.
- B. The electric strip heater shall be a component part of the indoor unit and shall be the KW and electrical characteristics as scheduled on the drawings. Heaters shall be complete with thermal and overload protection, and including a 24-volt control transformer, insulated terminal box and contactor. In addition, the heater shall be provided with an air flow pressure differential control wired through the fan motor control circuit.

2.2 OUTDOOR SECTION

- A. The outdoor unit shall be a two-speed electric heat pump designed for R-410A refrigerant, Trane model as scheduled. No substitutions shall be accepted.
- B. The casing shall be galvanized steel with baked enamel finish. The compressor shall be a two-speed welded hermetic type with internal vibration isolation and external neoprene mounts. The compressor shall have thermal and over-current protection, high pressure cut-out and crankcase heater.
- C. Condenser fan shall be multi-speed direct drive with vertical discharge propeller fan and fan/coil guards. Fan motor shall be permanently lubricated, inherently protected and resiliently mounted.

- D. Condenser coil shall be mechanically bonded fin and tube with changeover valve, quick attach refrigerant couplings, gauge taps, filter-drier and refrigerant metering device.
- E. Control shall be factory wired and shall include an anti-recycle timer control, outdoor thermostat, automatic defrost controls, control transformer, compressor contactor, and wiring terminal block with all components enclosed in a weatherproof compartment.
- F. Refrigerant tubing may be pre-insulated and pre-charged type as provided by the unit manufacturer. Where insulation is exposed to the weather, coat with vinyl lacquer two coats minimum.

2.3 HEAT PUMP SYSTEM

- A. The entire heat pump system shall consist of matched components rated in accordance with A.R.I. 240 and shall be UL labeled.

2.4 WARRANTY

- A. The units shall be warranted for all parts and labor for one (1) year from date of acceptance with an additional extended four (4) years warranty on the compressor. Register warranties with the manufacturer and provide Owner with copies.

2.5 ROOM THERMOSTAT

- A. Room thermostat shall be a Temperature and Humidity Controller type, seven (7) day programmable.

2.6 CONDENSATE DRAIN PIPING

- A. Piping shall be Schedule 40 PVC with solvent cemented joints. Provide P-trap at unit and insulate entire drain line with 5/8" thick foam plastic insulation, or 1" fiberglass with vapor barrier. Slope piping .25" per foot away from unit.

PART 3 - EXECUTION

3.1 HEAT PUMPS

- A. Heat pumps shall be installed as indicated and as recommended in the manufacturer's installation and operating instructions. Outdoor unit shall be mounted on a level concrete pad a minimum of 4" above surrounding grade.

3.2 AIR HANDLERS

- A. Mount air handler on cork-and-rubber vibration isolators or suspend from building structure with hangers having in-line spring isolators.
- B. Provide an auxiliary drain pan with liquid-tight seams for each air handler.
- C. Auxiliary drain pan shall be fitted with a normally closed float switch which shall disable the heat pump in the event of high water in the pan, and a 1" PVC pipe to discharge at a conspicuous location acceptable to the Building Official.

3.3 PAINTING

- A. Equipment and items with a factory applied finish shall have scratched, chips, etc., primed and touched up with paint to match color of equipment and/or items installed.

3.4 CLEANING AND ADJUSTMENTS

- A. Upon completion of work, clean, oil, and grease all fans, motors, other running equipment and apparatus and make certain that all such apparatus and mechanisms are in proper working order and made ready for tests.

3.5 TESTS

- A. Balance all supply direct/diffuser systems and provide complete air balance report to Engineer prior to requesting final inspection. Report shall be signed by a principal of the mechanical contracting firm.
- B. Start-up of heat pump systems and controls shall be performed by Trane certified factory service technician. System shall be set to operate in dehumidify mode.

3.6 CUTTING OF STRUCTURE

- A. Where it is required to cut any part of the structure for installation of equipment, the cutting shall be under the direction of the General Contractor.

3.7 ELECTRICAL

- A. All electrical work and materials shall conform to the requirements of Section 15010.
 - 1. Split-System Heat Pumps (Indoor Unit): Indoor unit and auxiliary strip heater shall be provided and installed by this Section. Indoor unit and strip heater shall be furnished with all operating and safety controls. This Section shall also provide and install all controls, control wiring, conduit, etc., and make connections required for complete installation.
 - 2. Control wiring shall be installed in conduit per Section 16100.
 - 3. Split-System Heat Pump (Outdoor Unit): Outdoor unit shall be provided and installed by this Section. The unit shall be provided with all operating and safety controls, conduit, wire, and shall connect electrically from load side of disconnect to outdoor unit. This Section shall also provide and install all the necessary controls, control wiring and conduit.
 - 4. Power wiring, including service disconnect, is provided under Division 16.

END OF SECTION 15875

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15895 - FANS

PART 1 – GENERAL

1.1 SCOPE

- A. Ventilating fans shall be of the size, type, arrangement, construction, performance accessories and electrical characteristics specified hereinafter and/or indicated on the drawings. Fans as may be available from Twin City, Greenheck, or Loren Cook equivalent to the specific manufacturer's model scheduled and complying with all other express requirements are acceptable.

PART 2 - PRODUCTS

2.1 ROOF-MOUNTED CENTRIFUGAL AND AXIAL FANS

- A. Shall have AMCA Certified Rating Seal, direct or belt drive as scheduled, aluminum construction, aluminum birdscreen, factory mounted disconnect switch and weatherproof construction. All aluminum backdraft dampers shall be provided unless specifically omitted by notation on the drawings.

2.2 CENTRIFUGAL CEILING FANS

- A. Shall have AMCA Certified Rating Seal, acoustically insulated cabinet, vibration proof grille and integral chatterproof backdraft damper. Provide wall caps and/or other accessories specified on the drawings.

2.3 IN-LINE CENTRIFUGAL FANS

- A. Fans shall be belt-driven in-line type. The square shaped fan housing shall be of heavy gauge galvanized steel. One of the sides shall be hinged and shall support the entire drive assembly and wheel allowing the assembly to swing out for cleaning, inspection, or service without dismantling the unit in any way. The motor shall be mounted on the hinged-side exterior isolated from the air stream. The belt and pillow block ball bearings shall be protected from the air stream by an enclosure. The shaft shall be keyed to both the wheel and pulley. The fan inlet shall be a spun venturi throat overlapped by a backward curved centrifugal wheel with spun cone for maximum performance. Air and sound shall be AMCA licensed.

2.4 PREFABRICATED ROOF CURBS

- A. Unless indicated otherwise, all roof-mounted fans and intake and relief air hoods shall be provided with 12" high insulated aluminum prefabricated roof curbs as manufactured by the fan or hood manufacturer. Curbs shall be suitable for the roof type used.

END OF SECTION 15895

16010 – ELECTRICAL GENERAL PROVISIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, General Conditions of the contract for Construction, AIA A201, 2007 Edition, apply to work of this Section and all subsequent Division 16 Sections.

1.2 WORK INCLUDED

- A. The work covered by this Division of the specifications consists of furnishing all material and labor, equipment and supplies, and performing all operations including cutting, channeling, chasing, excavating and backfilling necessary for the installation of complete wiring systems and electrical equipment, in accordance with this Division of the specifications and the accompanying drawings.
- B. Included are systems for lighting, power, connections to equipment furnished by others, telephone, fire alarm, and others as indicated.
- C. The work shall be coordinated with the work of other trades to insure correct location and installation of the building components and equipment required by all trades for electrical service.
- D. Prior to bidding the work, the Contractor shall examine all sections of the specifications and the complete set of Contract Documents and bring to the attention of the Architect and Engineer any omissions, conflicts, or concerns effecting this Division of the work.

1.3 DRAWINGS

- A. The drawings and specifications are complimentary to one another and what is called for by one shall be as binding as if called for by both.
- B. Drawings indicate generally the location of equipment and are to be followed as closely as possible. If due to job conditions it is found necessary to change the location of equipment, such changes shall be made without additional cost to the Owner and as approved by the Engineer.
- C. Verify final rough-in locations with field measurements and the requirements of the specific equipment to be connected.
- D. Refer to equipment specifications in all other sections for rough-in requirements.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- A. Execute and inspect all work in accordance with Underwriters Laboratories (UL), and all local and state codes, rules and regulations applicable to the trade affected as a minimum. If the plans and/or specifications call for requirements that exceed these rules and regulations, the more stringent requirement shall be followed. Follow applicable sections and requirements and testing procedures of NFPA, IEEE, NEMA, CBM, ANSI, NECA, IEC and NETA.

- B. The Contractor shall be responsible for the proper selection and application of materials and the methods of their installation. UL listed equipment shall be installed as specified in the latest edition of the "Electrical Construction Materials Directory."
- 1.5 PERMITS AND FEES
- A. The Contractor shall arrange for and pay for all inspections, licenses and certificates required in connection with the work.
- 1.6 TEMPORARY FACILITIES
- A. Light, Heat, Power, Etc.: Responsibility for providing temporary electricity, heat, and other facilities shall be as specified in Division 1.
 - B. Building distribution equipment and devices may only be used with written permission from the Owner. If used for temporary power, the equipment shall be properly maintained and the Contractor shall repair any damage resulting from use. The guarantee period for new equipment shall not begin until the equipment is turned over to the Owner.
- 1.7 ACCESSIBILITY
- A. Install equipment and materials to provide required code clearances and access for servicing and maintenance. Coordinate the final locations with piping, ducts, and equipment of other trades to ensure proper access for all trades. Coordinate locations of concealed equipment, disconnect switches, and enclosure boxes with access panels and doors. Allow adequate space for removal of parts, fuses, lamps, etc. that require replacement or servicing.
 - B. Extend all conduits such that junction boxes and pull boxes are in accessible locations.
 - C. Install access panels or doors where equipment or boxes are concealed behind finished surfaces.
- 1.8 EXISTING CONDITIONS
- A. The Contractor shall visit job site and verify all conditions and dimensions. No extra payment shall be approved for unforeseen items.
- 1.9 SHOP DRAWINGS
- A. Before starting work, prepare and submit to the Engineer for review six sets of all major items of equipment, including distribution equipment, all lighting fixtures, fire alarm equipment, etc. A cover sheet shall be included, listing manufacturer and model number of each item submitted. Continue to submit for the Engineer's review until a REVIEWED or MAKE CORRECTIONS NOTED action is received.
 - B. Recognize the purpose of shop drawings and other submittals is to inform the Engineer about equipment the Contractor proposes to furnish and install. Approved submittals are not change orders and do not give the Contractor authorization to deviate from the specification or the bid price for the project.
- 1.10 SUBSTITUTIONS AND APPROVALS
- A. Bids for work covered under this section of the specifications shall be based on the layout and equipment exactly as shown and specified. If the Contractor wishes to bid an alternate item, a request shall be submitted in writing in accordance with the General Conditions indicating such

substitutions within the specified period prior to bid opening. Such requests shall be accompanied by sufficient catalog data upon which a decision may be based.

- B. The burden of proof that proposed equipment is equal or superior to that specified shall be on the Contractor. Substituted equipment shall only be allowed where specifically listed by written addendum. If substitutions are not granted, the specified materials and equipment shall be installed. Where substituted equipment is allowed, it shall be the Contractor's responsibility to notify all related or affected trades of the accepted substitution and to assume full responsibility for any costs caused as a result of the substitution.
- C. Unless otherwise specified, all materials and equipment shall be of domestic (USA) manufacturer.

1.11 PRODUCT LISTINGS

- A. When two or more items of same material or equipment are required they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, sheet metal, steel bar stock, welding rods, solder, fasteners, and similar items used in work, except as otherwise indicated.
- B. Provide products that are compatible within systems and other connected items.

1.12 NAMEPLATE DATA

- A. Provide equipment having a permanently mounted, operational data nameplate indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliance, and similar essential data. Install equipment such that nameplate is readily accessible.

1.13 DELIVERY, STORAGE, AND HANDLING

- A. Refer to Division 1, sections on Transportation & Handling, and Storage & Protection.
- B. Deliver products to project site properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identification; adequately packaged and protected to prevent damage during shipment, storage, and handling.
- C. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage and weather.
- D. Coordinate deliveries of electrical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installation.

1.14 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installation that follow.
 - 1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the work. Coordinate installing large equipment requiring positioning before closing in the building.
 - C. Coordinate electrical service connections to components furnished by utility companies.
 - 1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
 - 2. Comply with requirements of Authorities Having Jurisdiction and of the utility company providing electrical power and other services.
 - 3. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.
- 1.15 RECORD DOCUMENTS
- A. During construction, the Contractor shall make a record of all changes, in erasable pencil, made to the Contract Documents, including accurate dimensions, where applicable, and shall record accurate dimensions locating all below-grade outside electrical utilities with reference to permanent above grade objects. This set of documents shall remain on the job site and be updated weekly.
 - B. Upon project completion, all changes noted in above shall be recorded neatly, with red ink, by the Contractor on an unused set of Contract Documents and submitted to the Architect. This project shall not be considered complete until the updated record documents have been received and reviewed by the Engineer. The reviewed Project Record Documents shall then be returned to the Architect.
- 1.16 OPERATION AND MAINTENANCE DATA
- A. Refer to Division 1, section on Project Closeout or Operation and Maintenance Data for procedures and requirements for preparation and submittal of maintenance manuals.
 - B. In addition to the information required by Division 1 for Maintenance Data, include the following information:
 - 1. Description of function, normal operating characteristics and limitations, fuse curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
 - 2. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown, emergency instructions, and summer/winter operating instructions.
 - 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 - 4. Servicing instructions, lubrication charts and schedules.
 - 5. Complete list of parts and wiring diagrams.
 - 6. Name, address and telephone numbers of the Contractor, Sub-contractors and local company responsible for maintenance of each system or piece of equipment.
 - 7. All information shall be permanently bound in a 3-ring binder. The job name & address and Contractor's name & address shall be permanently placed on both the cover and spine of each binder. Dymo-tape is not acceptable.
 - 8. Copies of all test reports shall be included in the manuals.

- C. This contract will not be considered complete nor will final payment be made until all specified materials, including test reports, have been provided and the Architect/Engineer has reviewed the manual.

1.17 WARRANTIES

- A. Refer to Division 1, section on Warranties and Bonds for Procedures and Submittal Requirements for Warranties. Refer to individual equipment specifications for warranty requirements. In no case shall the warranty for the total electrical system be less than one year from date of acceptance by the Owner.
- B. The Contractor shall furnish a written guarantee to the Owner covering a period of one year from the date of final acceptance of the installation. The guarantee shall cover materials and workmanship, and any omission or defects that may arise or be discovered during the period and shall be corrected in a manner that is acceptable to the Owner at no additional expense.
- C. Provide complete standard warranty information for each item. Information shall include product or equipment description, beginning date of warranty or bond; duration of warranty or bond; and names, addresses, telephone numbers and procedures for filing a claim and obtaining warranty services.
 - 1. Compile and assemble the warranties specified in Division 16 and include in Operation and Maintenance Manuals, tabulated and indexed for easy reference.
 - 2. Post the following warranty information on equipment: Length of warranty, installation date, Manufacturer's and Installer's contact information.

END OF SECTION 16010

16015 – SEISMIC PROTECTION FOR ELECTRICAL CONDUIT AND EQUIPMENT

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Seismic protection measures specified herein are in addition to any other items included in other sections of these specifications.
- B. Electrical and equipment to be protected shall include the following items:
 - 1. Conduit (referred to herein as piping)
 - 2. Switchgear
 - 3. Panelboards
 - 4. Light Fixtures
 - 5. Transformers
 - 6. Disconnect Switches
 - 7. Contactors
 - 8. Control Panels
- C. This facility is located in Seismic Zone D.
- D. Seismic restraints may be omitted from electrical conduit less than 2 1/2-inches trade size. All other interior conduit shall be seismically protected as specified.

1.2 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designations only.
 - 1. American Society for Testing and Materials (ASTM) Standards:
 - a. A 307-84 Carbon Steel Externally Threaded Standard Fasteners
 - b. A 325-85 High-Strength Bolts for Structural Steel Joints
 - c. A 576-81 Steel Bars, Carbon, Hot-Wrought, Special Quality

1.3 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall conform to the respective specifications and other requirements specified below:
 - 1. Bolts and Nuts
 - a. Square head bolts and heavy hexagon nuts, ANSI A 307 or A 576.
 - b. Bolts, ASTM A 325.
- B. Sway brace details shall conform to all applicable requirements cited therein.
- C. Flexible couplings shall be those specified for the piping system covered by other sections of these specifications, provided they will maintain a tight flexible joint under all reasonable conditions or pipe displacements due to settling or shifting of the ground expected with seismic activity.

1.4 SWAY BRACES

A. Sway braces shall be installed on piping not otherwise rigidly anchored to preclude damage during seismic activity as follows:

1. All piping 1-1/2 inches and larger and located in equipment rooms.
2. All other piping 2-1/2 inches and larger.
3. Pipes suspended by individual hangers 12 inches or less in length from the top of pipe to the bottom of the structural support for the hanger do not require sway braces.
4. Provisions of this paragraph apply to all piping within a 5-foot line around outside of building unless buried in the ground. Piping grouped for support on trapeze type hangers will be braced at the same intervals as hereinafter provided for individual pipe runs, with details increased in cross sectional area proportionate to the increased weight per linear foot of pipe or conduit and contents supported at each trapeze hanger. No trapeze type hanger will be secured with less than two 1/2 inch bolts.

B. Sway Braces for Pipe:

1. Transverse sway bracing shall be provided at 30-foot intervals.
2. Longitudinal sway bracing shall be provided at 40-foot intervals.
3. Vertical runs of piping 2 inches and smaller, extending between floor levels or between floor and roof shall be braced at midpoint.
4. Bolts used for attachment of anchors to pipe and structure shall be not less than 1/2-inch in diameter.
5. Anchor rods, angles and bars shall conform to Table 1, depending on length, seismic zone, etc.

TABLE I

SIZE OF ANCHOR BRACES REQUIRED

Type Brace	Maximum Actual Length
Angles	
1-1/2 x 1-1/2 x 1/4"	4'-10"
2 x 2 x 1/4"	6'-6"
2-1/2 x 2-1/2 x 1/4"	7'-0"
2-1/2 x 2-1/2 x 1/4"	8'-2"
3 x 2-1/2 x 1/4"	8'-10"
3 x 3 x 1/4"	9'-10"
Rods	
3/4"	3'-1"
7/8"	3'-7"
Flat Bars	
1-1/2 x 1/4"	1'-2"
2 x 1/4"	1'-2"
2 x 3/8"	1'-9"
Pipe	
1" (Sch 40)	7'-0"
1-1/4" (Sch 40)	9'-0"
1-1/2" (Sch 40)	10'-4"

2" (Sch 40)

13'-1"

1.5 SPREADERS

- A. Spreaders shall be provided between racked or adjacent piping runs to prevent contact during seismic activity whenever pipe is less than 2 inches apart. Spreaders to be applied at same interval as sway braces.

1.6 FLEXIBLE COUPLINGS OR JOINTS

- A. Flexible couplings or joints in building piping shall be provided at bottom of all pipe risers 4-inch size and larger.
- B. Expansion deflection couplings shall be provided in all pipe 2" or greater at structure expansion and seismic joints.

1.7 ANCHOR BOLTS

- A. All floor or pad-mounted packaged equipment required by any section of these specifications shall use cast-in-place anchor bolts in accordance with Table II which are securely fastened through bases. Two nuts on each bolt will be provided. Anchor bolts shall have a straight embedment length equal to at least 10 times the nominal diameter of the bolt. Expansion anchor bolts in lieu of cast-in-place bolts shall not be allowed.

TABLE II

SCHEDULE FOR CAST-IN-PLACE ANCHOR BOLTS

Equipment Operating Weight (lbs)	Anchor Bolt Diameter Size	Anchor Bolt Quantity
1,000	3/8"	4
5,000	1/2"	4
10,000	5/8"	6
20,000	3/4"	6
30,000	1"	6
50,000	1-1/4"	6
100,000	1-1/2"	6

- B. Anchor bolts shall extend into concrete floor or the foundation and as applicable, the floor or foundation shall be increased in depth to accommodate bolt lengths. Coordinate with concrete installer.

END OF SECTION 16015

16100 – BASIC MATERIALS AND METHODS

PART 1 – GENERAL

1.1 MATERIALS

- A. Except where noted otherwise, materials shall be new and as specified and shall not be substituted unless authority is obtained from the Architect or Engineer. All material shall be Underwriters approved and bear the UL label. The materials shall be standard products of an established manufacturing firm regularly engaged in the manufacture of such materials, and shall be the manufacturer's latest design unless distinctly specified to the contrary. All items of the same type shall be identical products of the same manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Protection: Materials and equipment shall be delivered to the job in the manufacturer's standard cartons, packages, and bundles, and shall be labeled to show the manufacturer's name, product, etc., on each item. Materials such as fixtures, lamps, panelboards, etc., shall be stored within a weatherproof building or other approved enclosure. Conduit, underground wiring, and similar materials shall be stacked 8" above the ground. All materials shall be protected from damage due to traffic on and about the job prior to, during, and after installation within the building structures, until the final acceptance of the work. Damaged materials and equipment shall be promptly removed from the premises and replaced with acceptable materials and equipment, without cost to the Owner.

1.2 COORDINATION

- A. Coordinate size and location of concrete bases for floor mounted distribution equipment. Cast anchor-bolt inserts into bases.

PART 2 – PRODUCTS

2.1 RACEWAYS AND FITTINGS

- A. All conductors and cables shall be installed in raceways. Metal clad cables (Type MC) are not acceptable, except as whips to lighting fixtures and then not to exceed 6 feet in length.
- B. All raceways in solid masonry construction or in wet areas shall be rigid metal conduit, made from mild steel, hot-dipped galvanized pipe conforming to ANSI C80.1 and UL 6.
- C. All exposed raceways below 6 feet above finished floor and subject to severe physical damage shall be rigid galvanized steel conduit
- D. All raceways except as noted above shall be rigid metal conduit or electrical metallic tubing (EMT), which shall be galvanized steel conforming to ANSI C80.3 and UL 797.
- E. Conduit run in earth shall be plastic coated or shall be painted with two coats of asphaltic paint conforming to NEMA RN 1. Fittings for coated conduit shall be plastic coated or wrapped with two layers of vinyl electrical tape. Non-metallic conduit conforming to NEMA TC 2 is acceptable if

a transition is made to the aforementioned protected metallic conduit where it leaves or enters the earth.

1. Underground, Concrete Encased: Type EB-20 RNC. Use a minimum of five feet of PVC coated rigid metal conduit at foundation penetrations.
 2. Underground, Not Concrete Encased: Schedule 40 PVC or Schedule 80 conduit. Use a minimum of five feet of PVC coated rigid metal conduit at foundation penetrations.
- F. All raceways for connection to vibrating equipment or freestanding equipment, including flow and tamper switches, transformers, and hydraulic, pneumatic, electric solenoid, or motor-driven equipment shall be flexible metal conduit (FMC) in dry locations in compliance with UL 1 and liquid-tight flexible metal conduit (LFMC) in damp and wet locations per UL 360.
- G. Surface metal raceways shall be furnished where indicated, and may be utilized in other areas upon specific approval of the Architect. Raceways shall be galvanized steel with snap-on covers. The cover shall be assembled to the base with a locking hinge. The base of the raceway shall have removable barriers to separate channels. The raceway and all components must comply with UL 94VO and be UL listed. Raceways shall be painted to match walls and/or bases, and colors shall be approved by the Architect. Raceways to be field-painted shall be furnished with a prime coat.
- H. Fittings:
1. Fittings for rigid conduit and EMT shall conform to ANSI C80.4. EMT fittings shall be interlocking, steel compression type, moisture proof. Terminal fittings shall have insulated throat.
 2. Fittings for flexible conduit shall be liquid-tight fittings as Ideal Vap-oil-tite Series 7500-500, O-Z Gedney Series 40, or Thomas & Betts Series 5300 and 6000, with insulated throats.

2.2 SUPPORTS

- A. Hangers shall be galvanized malleable iron one-hole type straps for single conduit and trapeze type for multiple conduits.

2.3 CONDUCTORS AND CABLES

- A. Building wires shall be thermoplastic insulated conductors per UL 83 and be manufactured to meet the standards of Insulated Cable Engineer's Association (ICEA).
- B. Branch circuit feeders whose length from panel to first outlet exceeds 100 feet for 120 volt circuits or 220 feet for 277 volt circuit shall be No. 10 or larger, as required by NEC.
- C. No. 10 AWG and smaller branch circuits shall be solid conductor, Type THWN, THW or TW, except for motor circuits.
- D. No. 8 AWG and larger branch circuits shall be stranded conductor, Type THWN or THW.
- E. Underground service entrance and underground feeders shall be 75 degree C, Type USE-RHH-RHW-THW-THWN insulation.
- F. Fixture wire shall have a maximum operating temperature of 150 degree C at 600 volts nominal: Type AF insulation for 120 volt or Type SF-2 insulation for 277 volt.

- G. All conductors shall be sized on the basis of the UL rated temperature ampacity for the equipment or device to which they are connected.
- H. All conductors shall be copper. No conductor smaller than No. 12 AWG shall be installed unless otherwise noted.
- I. Conductor connectors shall be the spliced type for No. 10 and smaller wire and shall be made with approved solderless device such as wing nut connectors as made by Ideal Industries. Spliced connections for wires No. 8 and larger shall be made with approved solderless compression-type connectors and insulation tape per UL 510.

2.4 OUTLET BOXES

- A. Boxes, extensions and rings shall be sheradized or galvanized, shall comply with UL 514, and shall be of the depth necessary to finish flush with the wall or ceiling surface. Boxes shall be code gage sheet steel at interior dry locations and cast metal with gasketed cover at damp or wet locations. Provide a grounding terminal in the interior of the box when wiring to an item that includes a grounding conductor.
- B. All boxes shall be sized in strict accordance with the National Electrical Code (NEC), Article No. 314, except that no box will be less than the minimum specified.
- C. Wall boxes for switches and receptacles shall not be less than 1-1/2 inches deep and of one piece construction, unless noted otherwise. Boxes shall be arranged with knockouts of the size required to receive the raceway fittings.
- D. Boxes shall have lugs or ears to secure covers or plaster rings.
- E. Ceiling boxes shall be 4 inches square x 1-1/2 inches minimum or 4 inches octagonal x 1-1/2 inches minimum.
- F. Boxes for lighting fixtures shall have studs where required by fixture design.
- G. Boxes shall be ganged where two or more devices occur at same location.
- H. For boxes in main feeder conduit runs, use sizes not smaller than 8-inches square by 4-inches deep. Do not exceed six entering and six exiting raceways in a single box

2.5 RECESSED FLOOR BOXES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Thomas & Betts, Hubbell, FSR, Inc. & Wiremold.
- B. Slab on Grade: Cast metal, fully adjustable, rectangular. Copper-free aluminum, unless otherwise noted, with integral threaded raceway entrances, and features and accessories suitable for each location including mounting ears and threaded screw holes for devices and closure plugs. Use standard depth boxes to permit side conduit entrance without interfering with reinforcing, but do not use boxes with more than 6-inch depth where slab depth will allow. Types, shape, sizes, and depth as indicated or required for each application. Use stainless steel screws and hardware. Boxes shall be ganged where two or more devices occur at same location. Provide low voltage barriers between ganged boxes when required. Provide as specified below, unless otherwise specified elsewhere or shown on the drawings.

1. One, Two and Three-Gang Floor Box: Thomas & Betts, Steel City 640 Series flush floor box with P64-CP brass carpet flange and device cover plates. P64-DS (duplex receptacle), P64-GFCI (GFCI duplex receptacle or communication outlet).
2. Multiservice Floor Box: Wiremold RFB Series. Cover shall be flanged, die-cast aluminum assembly, brass color. Lid area to be flush with the finished floor, no cutouts provided. Provide with required device inserts and cover plates.

C. Above grade floor boxes shall be stamped steel.

2.6 WIRING DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Cooper, Watt Stopper, Hubbell, Leviton, Lutron, and Pass & Seymour.
- B. Snap switches shall be commercial specification grade, AC quiet type, grounding (screw) type, back- or side-wired, rated at 20 amperes at 125/277V AC with toggle handle, as specified below, unless otherwise specified elsewhere or shown on the drawings:
- Cooper CS120 – single-pole.
 - Cooper CS320 – three-way.
 - Cooper CS420 – four-way.
- C. Dimmer switches shall be commercial specification grade with on/off toggle handle and slider. Fluorescent dimmer switches shall be compatible with dimming ballasts. Switches shall be as specified below, unless otherwise specified elsewhere or shown on the drawings:
- Pass & Seymour CD703P, CD1103P, CD1603P & CD2003P – 700, 1100, 1600 & 2000-watt incandescent dimmers respectively.
 - Pass & Seymour CD3FB163P – 120V, 16A, 3-wire fluorescent dimmer.
 - Pass & Seymour CD3FB103P277 – 277V, 10A, 3-wire fluorescent dimmer.
- D. Automatic switches (occupancy sensor) shall be commercial specification grade, dual technology, 180-degree coverage, line voltage, light level sensor, walk-through mode with manual override button(s) and choice of Auto-On or Manual-On operation. Switches shall be as specified below, unless otherwise specified elsewhere or shown on the drawings:
- Watt Stopper DW-100 – single relay.
 - Watt Stopper DW-103 – single relay, multi-way.
 - Watt Stopper DW-200 – dual relay.
 - Watt Stopper DW-203 – dual relay, multi-way.
 - Watt Stopper TS-400 – digital timer (Time-out adjustment set to 15 minutes).
- E. Ceiling mounted occupancy sensor shall be commercial specification grade, dual technology, 360-degree coverage, line voltage, light level sensor, walk-through mode and choice of Auto-On or Manual-On operation. Sensor shall be as specified below, unless otherwise specified elsewhere or shown on the drawings:
- Watt Stopper DT-355.
- F. Where shown near doors, wall switches shall be mounted not less than 2 inches nor more than 12 inches from trim, except where double doors are shown install switches 2 to 12 inches beyond door swing.

- G. Duplex receptacles shall be commercial specification grade, straight blade, back- or side-wired, rated 20 amperes at 125 volts, NEMA 5-20R, as specified below, unless otherwise specified elsewhere or shown on the drawings:
- Cooper BR20 – duplex receptacle.
 - Cooper VGF20 – GFCI duplex receptacle, non-feed-through type.
 - Cooper 1210 – TVSS duplex receptacle, integral. Cooper 1209 – Provide six spare replacement modules.
- H. Weatherproof duplex receptacles shall consist of a grounding type duplex receptacle, as specified above, with GFCI feature installed in Appleton or Crouse-Hinds type FS cast box with weatherproof cover and gasket or equal combination, unless otherwise specified elsewhere or shown on the drawings.
- Cooper 966 – wet location, self-closing lid.
- I. Where weatherproof outlets may be utilized continuously or are in “wet” locations, shall conform to the requirements for weatherproof receptacles and shall be installed with a hinged outlet cover/enclosure clearly marked “Suitable For Wet Locations While In Use” and “UL Listed.” There must be a gasket between the enclosure and the mounting surface, and between the hinged cover mounting plate/base to assure proper seal, unless otherwise specified elsewhere or shown on the drawings.
- Cooper WIU-1 – while-in-use cover.
- J. Special receptacles shall be as shown on the drawings. Single outlets shall be Cooper, Hubbell, Bryant, Leviton or equal of voltage and ampere rating indicated by NEMA configuration.
- K. Finish: Wiring devices shall be colors indicated below unless otherwise indicated or required by NFPA 70.

<u>System or Type</u>	<u>Color</u>
Normal Power System	White or as selected by Architect
Emergency Power System:	Red
TVSS Devices:	Blue
Isolated Ground Receptacles:	Orange
Specific-Use Device:	Black

- L. Wiring Device Cover Plates:
1. Plates for switches and receptacles shall be ganged where indicated at same location.
 2. All device boxes installed for future wiring shall have blank plates.
 3. Cover plates shall be jumbo size, single and combination type to match corresponding devices, 0.04-inch thick, smooth high-impact thermoplastic with metal screws and shall be white or as selected by Architect.
 4. Cover plates for exterior receptacles in damp or wet locations shall comply with NEC Article No. 406.8 and 20 ampere 120 volt receptacles shall be UL listed with plug cap inserted in receptacle.

2.7 DISTRIBUTION EQUIPMENT

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Square D.

- B. Furnish and install circuit breaker panelboards as indicated in the panelboard schedule and where shown on the plans. Panelboards shall be cabinet enclosures, dead front safety type with hard-drawn copper, 98% conductivity phase and ground bus and equipped with thermal-magnetic molded case circuit breakers of frame and trip ratings as shown on the schedule. Panelboards shall conform to UL 67 and UL 50.
- C. All panel boards, switches, fuses and circuit breakers shall be capable of withstanding and/or interrupting the short circuit current available at the device's terminals. The contractor shall contact the supplying utility for the exact available short circuit current. Initial estimates are on the drawings, or the following approximate values can be used for estimating purposes.

<u>Three Phase Service Capacity</u>	<u>A.I.C.* @ 208Volt-3Phase</u>	<u>A.I.C.* @ 480Volt-3Phase</u>
< 600 Amps	(20) x (Service Cap.)**	10,000 Amps
600 – 800 Amps	(20) x (Service Cap.)**	20,000 Amps
801 – 2000 Amps	(20) x (Service Cap.)**	25,000 Amps
> 2000 Amps	(20) x (Service Cap.)**	(10) x (Service Cap.)**

* A. I. C. is the Amperes Interrupting Capacity in Amps, RMS, Symmetrical.
 ** For a 208-Volt 3-Phase service with 600-Amp capacity, the A.I.C. would be (600 X 20 = 12,000) 12,000 Amps, RMS, Symmetrical.

- D. Circuit breakers shall be quick-make, quick-break, thermal-magnetic trip indicating, and have common trip on all multi-pole breakers. Trip indication shall be clearly shown by the breaker handle taking a position between ON and OFF position when the breaker is tripped. Branch circuit breakers feeding convenience outlets shall have sensitive instantaneous trip setting of not more than 10 times the trip rating of the breaker in order to give "flash protection" for frayed stranded wire cords. All connections to the bus shall be bolted.
- E. Bus bar connections to the branch circuit breakers shall be the "distributed phase" or "phase sequence" type. Three phase, 4-wire panelboard bussing shall be such that any two adjacent single-pole breakers are connected to different polarities and in such a manner that 2-pole and 3-pole breakers can be installed in any location. Similarly, 1-pole and 2-pole breakers can be installed in any location in single phase, 3-wire panelboards and load centers. Each panelboard shall have an insulated neutral bus and appropriate connectors for feeder and branch circuits. Each panelboard shall have a separate equipment grounding bus with appropriate connectors/terminals for all feeders and branch circuits. The equipment ground bus shall be bonded to the neutral bus only at the main service disconnect. The cabinet shall be bonded to the equipment ground bus with the conductor sized per Table 250.122 of the NEC. Service main ratings shall be as shown in the panelboard schedule on the drawings.
- F. Panelboard terminals for main and branch circuit wiring, both breaker and neutral, shall be UL listed as suitable for the type of conductor specified.
- G. Panelboard circuit breaker position numbering shall be such that starting at the top, odd numbers shall be used in sequence down the left-hand side and even numbers shall be used in sequence down the right-hand side.
- H. The panelboard bus assembly shall be enclosed in a steel cabinet. The size of the wiring gutters and gage of steel shall be in accordance with NEMA PB1 and UL 67 for panelboards. The enclosure shall be fabricated from galvanized steel or equivalent rust resistant steel. Fronts shall include door and have flush, brushed stainless steel, cylinder tumbler-type locks with catches and spring-loaded door pulls. The flush lock shall not protrude beyond the front of the door. All

panelboard locks shall be keyed alike. Fronts shall have adjustable indicating trim clamps which shall be completely concealed when the doors are closed. Doors shall be mounted by completely concealed steel hinges. Fronts shall not be removable with door in the locked position. A circuit directory frame and card with a clear plastic covering shall be provided on the inside of the door. The directory card shall provide a sufficient space for each circuit. The directory shall be typed to identify the load fed by each circuit and shall reflect all revisions that may have occurred during construction.

- I. Molded case circuit breakers shall comply with NEMA AB1. Circuit breaker types shall be UL listed and rated for the load being fed.
 - 1. HACR: Air conditioning equipment.
 - 2. Arc Fault Circuit Interrupting (AFCI): Lighting and power circuits in bedrooms.
 - 3. HID: Fluorescent and high intensity discharge light being switched at the circuit breaker.

2.8 SAFETY SWITCHES

- A. Manufacturers: Shall be of same manufacturer as Distribution Equipment.
- B. Safety switches shall be fully enclosed, general duty, 240 or 600 volt, as indicated. Enclosure shall be metallic, general purpose for interior locations and rain-tight, NEMA 3R, with rain-tight hubs for exterior locations. Provide solid insulated neutral bus where required by the equipment. All switches shall include an equipment ground lug. Switches shall be non-fused, unless otherwise indicated. Fused switches, where indicated on drawings, shall be fitted with dual element, time delay, non-renewable fuses. Provide a spare set of fuses for each fused switch.

2.9 SURGE PROTECTION DEVICES (SPD)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: Advanced Protection Technology, Current Technology, Liebert Corporation, or Thor Systems, Inc.
- B. Standards: UL 1449, 1283, ANSI/IEEE C62.41.1-2002, C62.41.2-2002, C62.45-2002, NEC Article 285.
- C. Type 2, plug-in style (field replaceable per-phase modules), solid state, parallel-connected, sine-wave tracking suppression and filtering modules in a NEMA 12 enclosure.

- 1. Minimum Single-Impulse Current Ratings:

<u>SPD Location</u>	<u>Per Mode</u>	<u>Per Phase</u>	<u>Per System</u>
Service Entrance (Load Side)	120	240	360

- 2. UL 1283 EMI/RFI filtering with minimum attenuation of -50dB at 100kHz.
- 3. Short Circuit Current Rating (SCCR) of 200kA.
- 4. Protection modes shall be Line to Neutral, Line to Ground, & Neutral to Ground.
- 5. UL 1449 Listed Voltage Protection Ratings (VPRs) shall not exceed the following:

<u>System Voltage</u>	<u>L-N</u>	<u>L-G</u>	<u>N-G</u>	<u>MCOV</u>
120/240 Split Phase: 2W+N+G	700	700	700	150
120/208 Three Phase WYE: 3W+N+G	700	700	700	150

277/480 Three Phase WYE: 3W+N+G 1200 1200 1200 320

6. Accessories:

- a. Form-C contacts, one normally open and one normally closed, for remote monitoring of system operation. Contacts to reverse position on failure of any surge diversion module.
- b. Audible alarm activated on failure of any surge diversion module.
- c. Warranty: Manufacture's standard form in which manufacturer agrees to repair or replace components of SPD and associated auxiliary components that fail in materials or workmanship within five years from date of Substantial Completion.

2.10 LIGHT FIXTURES

- A. Light fixtures shall conform to the UL Standard for light fixtures, Publication No. 57, and shall be complete with lamps, lens, diffusers, canopies, and all necessary accessories, fittings, and mounting hardware. Light fixtures shall be surface-mounted, semi-recessed, or recessed type as indicated in the fixture schedule and shall be furnished with hangers, plaster rings, or other devices for a neatly finished installation. All fixtures shall be factory wired and assembled. The Contractor shall be responsible for ordering fixtures designed for installation with the ceiling indicated for the various spaces. Recessed fixtures in fire-rated assemblies shall be provided in compliance with the respective UL design assembly regulations.
- B. Incandescent fixtures shall not be permitted, unless otherwise indicated.
- C. Ballasts: All fluorescent fixtures shall be equipped with CBM certified premium Class P, Class A sound rated, energy saving high power factor electronic ballast with normal ballast factor for the voltage indicated. Total harmonic distortion shall not exceed 10% of fundamental. Ballasts must meet FCC rules and regulations Part 18, 15J for EMI and RFI. Power Factor must exceed 98%, Normal Ballast Factor range shall be between 0.85 and 1.00, and Crest Factor must not exceed 1.7. Ballast case temperature shall not exceed 90 degree C when fixture is operated at normal room temperature of 77 degree F. All ballasts must meet all requirements of ANSI C82.11.
 1. Acceptable manufacturers: Advance, Osram-Sylvania, GE, Bodine, or Iota.
 2. Remote ballasts shall be mounted per manufacturer's recommendation and shall be accessible.
- D. Lamps shall be of wattage specified on the fixture schedule. Fluorescent lamps shall be bi-pin type using low-energy cool white (4100 degree K) tubes. Incandescent lamps shall be as called for on the drawings and for 125-130 volts.
 1. Acceptable manufacturers: Phillips, Osram-Sylvania, or GE.
- E. Ballast and Lamps shall be compatible.
- F. LED Fixtures: Comply with UL listings and is DLC listed.
- G. See drawings for Light Fixture Schedule.

2.11 LIGHTING CONTROL PANEL – Not Applicable

2.12 GROUNDING

- A. Grounding will be required for all feeders and branch circuits using green insulated ground conductor run with the hot and neutral conductors. Size equipment ground wires per Table 250.122 of the NEC. Bond motors and all non-current carrying metallic parts of electrical equipment, devices, light fixtures, raceways, etc. per the NEC.
- B. Grounding rods shall be a minimum of 3/4 inch in diameter x 10 feet long, sectional type, of copper clad steel with a copper wall thickness of not less than 0.013 inch. Connectors shall be solid copper or brass U-bolt clamps.
- C. Intersystem bonding termination shall be provided and shall include provisions for connecting at least three grounding or bonding conductors required for communications systems with a minimum 6 AWG copper conductor.
- D. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators. Provide where indicated on drawings.
- E. Connectors: Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

2.13 FIRESTOPPING

- A. All conduits which pass through fire-rated assemblies, or are run inside fire-rated walls, floors or ceiling, shall be firestopped on both sides of the penetration in accordance with UL 1479 and ASTM E 814.
- B. Firestopping materials shall be as manufactured by 3M Company, CP-25 caulk, moldable putty, FS-195 strips, and CS-195 sheets, or equal by Dow-Corning.

PART 3 – EXECUTION

3.1 GENERAL

- A. All work shall conform to the best recognized practices of the trade, employing the latest accepted techniques and using modern tools and equipment in accordance with requirements of safety rules and regulations. The work shall be performed by competent workmen, skillful and experienced in the particular type of work to be performed, and under the supervision of a competent and experienced foreman. Only qualified electricians shall be used for installation and wiring of panelboards, control devices, motors, and equipment. The Electrical Contractor shall consult with the General Contractor and other trades as necessary to determine exact requirements for installation of the equipment required by other trades. Before work commences, a coordination drawing shall be created which shall be reviewed with the construction superintendent to eliminate interference with building components and insure proper location of the various electrical devices. The location of outlet boxes shall be double checked with the construction superintendent immediately prior to placing concrete and wallboard.

3.2 RACEWAYS AND FITTINGS

- A. All raceways shall be concealed in walls or ceiling unless otherwise noted. No conduit shall be less than 1/2 inch in size. Generally, the conduit runs shall be parallel with, or at right angles to, the building walls, beams, and joists. Bends and offsets in conduit shall be smoothly made using an appropriate bending tool. Offsets and bends in each run of conduit shall be kept to the minimum that will permit installation. Where excessive bends are required, the size of the conduit

will be larger in accordance with requirements of the NEC. Conduit shall be supported using strap hangers, beam clamps, or other approved devices to prevent vibration and excessive sagging between the supports. In slabs, conduits shall be installed at least 1-1/2 inches below top of floor. Vertical runs of conduit shall be securely supported with clamps or other devices at the lower end of each vertical run. Such supports shall be adequate to support the weight of the conduit and enclosed conductors. Fittings for all conduit shall be made mechanically tight for electrical continuity through the entire installation. Terminal fittings at panelboards and outlet boxes shall have plastic throat bushings. Provide temporary plugs in open ends of all conduit during the construction period to prevent entrance of foreign matter. Clean inside of raceways before installing conductors.

- B. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- C. Ream raceways and butt ends into couplings; all threaded joints shall be made tight. Install raceways with no more than four quarter-bends per run maximum. Install no pull box in an inaccessible location. Fasten raceway to boxes with locknuts and bushings. Wherever threads are left exposed or where protective coatings have been removed during installation, provide two coats of galvanize-coating paint.
- D. Tables in Appendix C of latest NEC shall apply unless larger raceway specified.
- E. EMT shall be secured for grounding purposes by means of concrete-tight connections of the interlocking compression ring, or stainless steel multiple joint locking ring type. Set screws or indentation fittings shall not be acceptable. EMT 3/4 inch or larger shall be provided with insulated connectors.
- F. Flexible type conduit shall be used for a pigtail type connection between the rigidly mounted terminal outlet box and each lay-in light fixture and the final connection to vibrating equipment and freestanding equipment, including flow and tamper switches, transformers, and hydraulic, pneumatic, electric solenoid, or motor-driven equipment. Flexible conduit for outdoor equipment shall be liquid-tight type using moisture-proof fittings. Conduit length shall be no more than 36 inches. Install separate ground connector across flexible connections.
- G. Surface mounted conduit shall be painted to match walls with paint acceptable to Architect.
- H. Conduit passing through concrete walls shall be fire-sealed.
- I. Sleeves: Install in concrete slabs and walls and all other fire-rated floors and walls for raceways and cable installations as required:
 - 1. Where sleeves through floors are installed, extend above finish floor.
 - 2. Where individual conduits penetrate fire-rated walls and floors, provide pipe sleeve one size larger than conduit; pack void around conduit with fire rated insulation and seal opening around conduit with UL-listed firestopping sealant. Conduits on trapeze type support system shall require fire taping only. See Architectural plans for location and extent of fire rated assemblies.
 - 3. Where conduits are to be installed through structural framing members, the contractor shall provide sleeves. For areas where sleeves have not been provided, the Architect's written approval must be obtained prior to cutting, notching or drilling of structural framing members.
- J. Emergency Circuits: Shall be run completely in metal conduit and be in a separate raceway system, isolated from non-emergency circuits.

3.3 CONDUCTORS AND CABLES

- A. Conductors shall not be installed in the raceway until the building is closed-in and dry. Before installation, the raceway shall be examined and all dirt and debris shall be removed by the use of swabs, vacuum cleaner, blower, or other devices. Conductors shall not be installed in conduit that has moisture accumulation. Special care shall be exercised during the 'pulling' of the conductors in raceway system to prevent damage to the conductor insulation. Lubricant shall be of a type that will not cause deterioration of the raceway or the conductor insulation. Conductors shall be a minimum of No. 12 AWG. Conductors run in vertical raceways shall be supported per NEC Article No. 300.19.
- B. Conductors for branch lighting and appliance circuits shall be run as single phase, 2-wire, 120 volt service except that a common neutral may be used for 2 or 3 circuits when each circuit is on a different phase (increase neutral by one size if non-linear load is on two or more circuits). A separate neutral will be required in all other cases.
- C. Splices shall be made only in accessible outlet or junction boxes.
- D. Conductor connections shall be made tight with screws set home to prevent loosening. Use insulated wire nuts for taps and splices in No. 10 and No. 12 gage wires. Split bolt connectors shall be used on No. 8 and larger size conductors. Uninsulated splice devices shall be covered with not less than 3 layers of rubber tape, and additionally with friction or plastic tape.
- E. Conductors at each outlet device shall have 8 inches long terminal leads to facilitate wiring device installation and shall be neatly curled into the box before installation of the device and cover. Conductors within panelboards and other equipment shall be neatly run to permit ease in tracing. Random type bird nest wiring will not be permitted.
- F. Wire markers shall be used to mark wires within panelboards corresponding to the circuit number and within outlet boxes where the same color is repeated for two or more circuits. Wire markers shall be Brady E-Z code or an approved equal.
- G. Conductors shall be color coded as follows:

<u>277/480V., 3 PH.</u>	<u>120/208V., 3 PH.</u>	<u>120/240V., 1 PH.</u>
Phase A - Brown	Phase A - Black	Phase A - Black
Phase B - Orange	Phase B - Red	Phase B - Red
Phase C - Yellow	Phase C - Blue	Neutral - White
Neutral - Gray	Neutral - White	Ground - Green
Ground - Green	Ground - Green	

3.4 OUTLET BOXES

- A. Outlet boxes shall be provided for all light fixtures, wiring devices, and equipment connections. Boxes shall be of size and type to properly accommodate the size and number of raceways entering the box and conductors.
- B. Attachment devices for outlet boxes shall be nails for wood construction and bolts, clamps or powder-actuated studs for masonry or light steel construction. Install in such a manner that will not cause structural damage to the structural members. Welding of boxes and conduit will not be permitted.

- C. Boxes for ceiling mounted light fixtures shall be securely mounted to the building structural members. Where light fixtures are to be supported directly from the outlet box, the box anchorage shall be sufficiently rigid and strong to prevent movement of the box and fixture in the completed structure.
- D. Outlet boxes for surface-mounted light fixtures shall be set so that the face of the outlet box is flush with the finished ceiling or wall surfaces as applicable.
- E. Outlet boxes for lay-in light fixtures shall be mounted to the nearest structural member above the fixture location with fixture connection made using flexible conduit from outlet box to the light fixture.
- F. Outlet boxes in metal stud partitions shall be installed on bar hangers rigidly fastened to at least two studs.
- G. Outlet boxes for wall switches shall be mounted on the strike edge of the door, 48" above the floor. Where more than one switch is indicated as side-by-side, the box shall be of size to permit gang-mounting of all switches within a single box.
- H. Outlet boxes for wall switches shall be mounted on the strike edge of the door, 48" above the floor to center of box. Where more than one switch is indicated as side-by-side, the box shall be of size to permit gang-mounting of all switches within a single box.
- I. In cases where the finished wall is masonry construction, rough-in heights may be adjusted to suit the block course; outlets should occur at the top or bottom of the masonry units.
- J. Back to back outlet boxes are not permitted. Separate boxes a minimum of 6 inches in standard walls and 24 inches in acoustical walls.
- K. Cap unused knockout holes where blanks have been removed and plug unused conduit hubs.
- L. Protect outlet boxes to prevent entrance of plaster, and debris during construction. Thoroughly clean foreign material from boxes before conductors are installed.

3.5 WIRING DEVICES

- A. Install wall switches so that the load is off when the toggle is in the down position. Gang switches under common plate where two or more indicated at same locations. Mount switches at 48 inches above finished floor to center of the junction box.
- B. Install duplex receptacles in the vertical direction with the grounding terminal [down][up], except where specifically otherwise indicated. Above counter duplex receptacles shall be mounted horizontally with the grounding terminal on the [left][right].
- C. Special outlets shall be installed to suit the equipment served. Verify electrical requirements with the respective equipment manufacturer's approved shop drawings and coordinate with the installing contractor.
- D. Provide plaster rings when necessary to install cover plates flush with finished wall or ceiling surfaces.
- E. Locate automatic switches (occupancy sensors) per manufacturer's recommendations for proper operation and where there are no obstructions within coverage area. Coordinate with final furniture layout.

- F. When there are multiple occupancy sensors (wall and/or ceiling) within a single room, connect so that when one sensor is activated the entire space will illuminate unless otherwise indicated on the drawings

3.6 DISTRIBUTION EQUIPMENT

- A. Distribution equipment shall consist of power and lighting panelboards, safety switches, raceway, conductors, etc., as indicated on the drawings and as specified herein. Cabinets and other enclosures shall be anchored to the building structure. The entire installation shall be designed and installed to safely support the weight of the equipment, and shall be installed in a manner that will not damage the structure or interfere with the installation of the various electrical devices and equipment. Splice boxes shall be fitted with removable covers and shall conform to the requirements of the NEC for the task intended. All boxes and cabinets shall be neatly and accurately drilled, or punched, to receive the raceway fittings.
- B. Before installation of the electrical panels, the systems shall be planned and the exact location determined to eliminate interference with other building components. Panelboards shall be erected so that the top is not more than 7 feet 8 inches above the floor and with a minimum bottom clearance of 6 inches above the finished floor. Surface or recess mount as indicated on the drawings. Where wall thickness indicated on the drawings will not permit installation of the cabinet depth, the Architect shall be consulted for instructions. Surface mounted cabinets and switches shall be installed to permit opening of the doors and free and easy access to switch handles and other adjacent devices. Exposed conduit for panel feeders and branch circuits shall be arranged to obtain a neat installation and to permit finishing of the wall and ceiling surfaces in a workmanlike manner.
 - 1. Recessed mounted cabinets, provide a 1 inch spare conduit with pull string stubbed to above the accessible ceiling for every three spares or spaces.
- C. Label the front of each panelboard and switch to conform to the riser diagram or as specified. Label shall consist of an engraved plate punched or drilled for mechanical fasteners attached to the panel front. Letters shall be not less than 1" in height and of a contrasting color.
 - 1. Engraved legend with black letters on white face for normal.
 - 2. Engraved legend with white letters on red face for emergency.
 - 3. Engraved legend with white letters on green face for ground connections.
- D. Balance loads to within 10 percent on all phase buses in the distribution equipment.
- E. A sign stating DANGER ARC FLASH HAZARD in 3/4-inch high letters shall be permanently affixed to the front panel of all panelboards in accordance with NEC Article No. 110.16.
- F. The contractor shall verify power and circuit breaker requirements for mechanical equipment with the Mechanical Contractor prior to ordering distribution equipment and conduit and conductor rough-in. Report major discrepancies to the Engineer.
- G. Install floor-mounted distribution equipment on concrete bases.

3.7 SURGE PROTECTION DEVICES

- A. Install the SPD device directly above the protected equipment, where space permits, or as close as possible to the protected equipment. Conductor lengths shall be kept to a maximum of 18-inches or less.

- B. Provide overcurrent protection, sized as recommended by the manufacturer, from the main distribution panel.

3.8 LIGHT FIXTURES

- A. Light fixtures shall be installed per NEC Article No. 410, and as shown on the electrical drawings. Architectural reflected ceiling plans shall govern upon any light fixture location discrepancies.
- B. The Contractor shall consult with the Mechanical Contractor before installation of the duct work and the electrical work to eliminate conflicts between the two trades. Electrical fixtures shall not be relocated except when specifically approved by the Architect.
- C. Recessed light fixtures shall be installed flush, snugly fitted to the wall and ceiling surfaces, and shall be securely anchored in place with their weight independent of the ceiling. Lay-in light fixtures shall be suspended at all four corners from building structure using 12-gage galvanized steel wire. Light fixtures shall also be attached to ceiling grid with approved attachment clips. Diffusers and hinged frames shall be free from vibration.
- D. Ballasts causing excessive noise and flickering of the lamps shall be replaced and all fixtures shall be placed in operation complete with lamps before final acceptance.
- E. This Contractor shall provide support structure of Unistrut or Kindorf as required or shall support fixtures from building structural system with approved beam clamps or other devices.

3.9 LIGHTING CONTROL PANEL – Not Applicable

3.10 EQUIPMENT CONNECTIONS

- A. The Contractor shall be required to make connections to equipment furnished and installed by other trades as indicated on the drawings. The Contractor shall furnish electrical service, including conductor and conduit, from panelboards to the equipment, terminating in an outlet box located adjacent to the equipment and securely anchored to the building structure. Final connection between the outlet box and the equipment shall be made using flexible conduit from the outlet to the junction box on the equipment. Motor starters or other type of control equipment furnished with equipment provided by other trades shall be installed and connected by the Contractor; connect power wiring to all equipment. The Contractor shall be responsible for actual wire connections at one point on packaged equipment only. Testing of the equipment shall be the responsibility of the installing trade. Where indicated, disconnect switches, fused or non-fused, shall be installed adjacent to the equipment location. Electrical equipment specified as a part of this section or furnished by other trades shall be completely installed and tested by the Contractor.
- B. The Contractor shall verify all Food Service Equipment power and receptacle requirements by reviewing cut sheets provided by the Owner/Contractor before rough-in. The Electrical Contractor shall also confirm power and receptacle requirements for medical or other equipment with the Contractor supplying that equipment prior to installation.

3.11 GROUNDING

- A. Grounding shall be as hereinbefore specified. Except where specifically indicated to the contrary, all exposed non-current carrying metal parts of electrical equipment, raceway system, and neutral conductor shall be grounded. Install grounding type bushing with jumper cables to panelboards and feeder raceway. Provide an equipment grounding conductor in all feeders and branch circuits sized per NEC Table 250.122. Flexible raceway shall have a green color grounding

conductor run with the electrical phase conductors. Each item of prefabricated equipment and each electrical motor shall be grounded with a green colored conductor connected to the grounding lug of the outlet box and to the grounding pole of the receptacles. Bond panelboards to incoming and outgoing feeder raceways with grounding-type bushings with jumper cable per NEC.

- B. Intersystem bonding termination means shall be installed at one of the following specific locations per NEC Article No. 250.94:
1. Meter socket enclosure.
 2. Service equipment enclosure.
 3. Grounding electrode conductor.

3.12 FIRESTOPPING

- A. Firestopping materials shall be applied per manufacturer's written instructions.
- B. Identification: Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:
1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 4. Date of installation.
 5. Through-penetration firestop system manufacturer's name.
 6. Installer's name.

3.13 COMPLETION

- A. Final Adjustment: Final adjustment shall be made prior to the final inspection. The entire electrical system shall be checked and all defective lamps, switches, receptacles, and other items of equipment shall be replaced. Cover plates and lighting fixtures shall be checked and aligned. All panels shall be clearly labeled and the directory in each distribution panel shall be neatly typed to show the use of each circuit.
- B. Tests: Following completion of all wiring installations, test each system and eliminate any grounding of potential conductors, short circuits and other faults. Test all receptacles with a test instrument which tests for properly-wired phase, neutral, and ground connections. Defray cost for all adjustments necessary to bring system up to standards set forth by Contract Documents. All scheduled inspections shall be conducted by a principal of the Electrical Contracting Firm.

END OF SECTION 16100